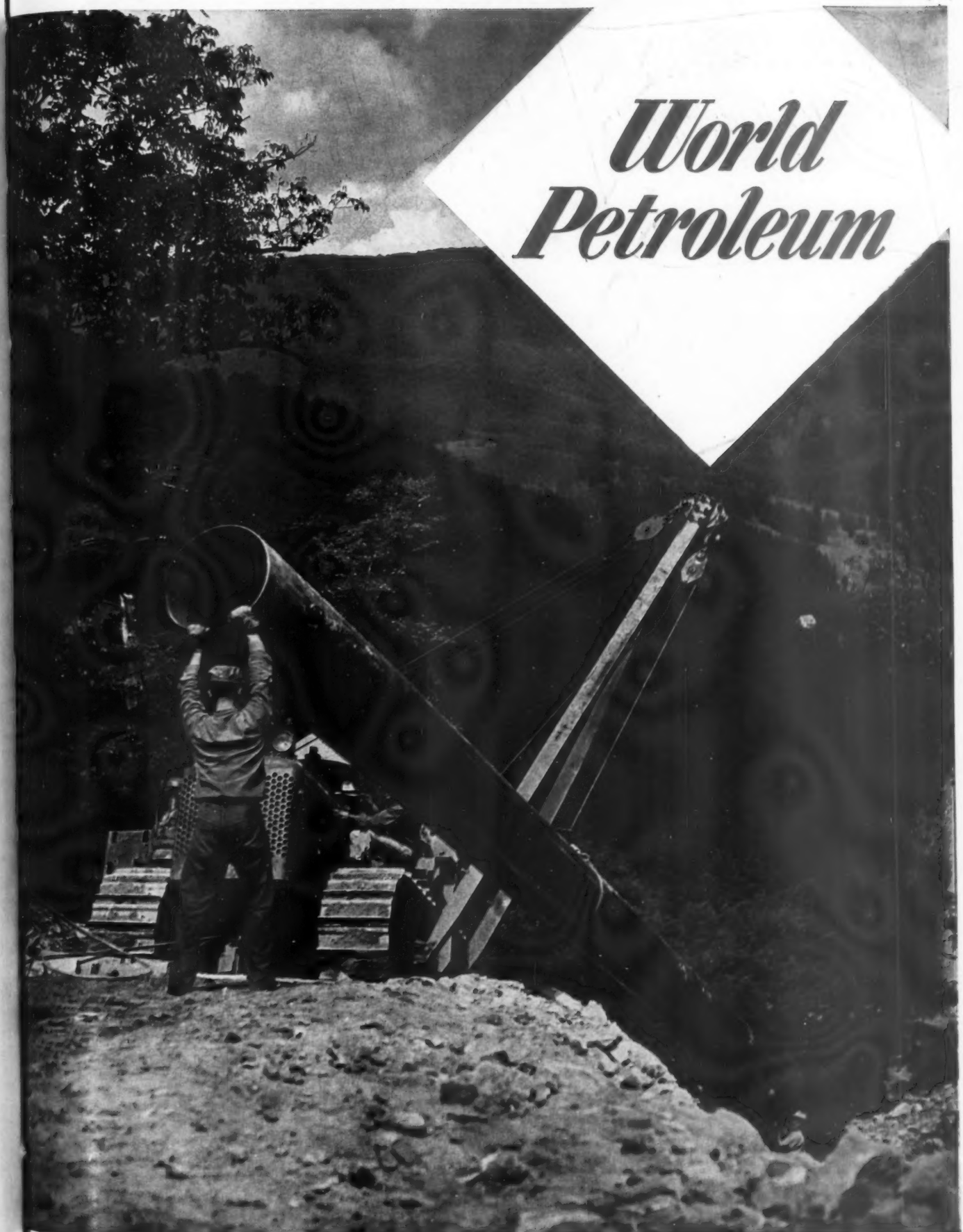
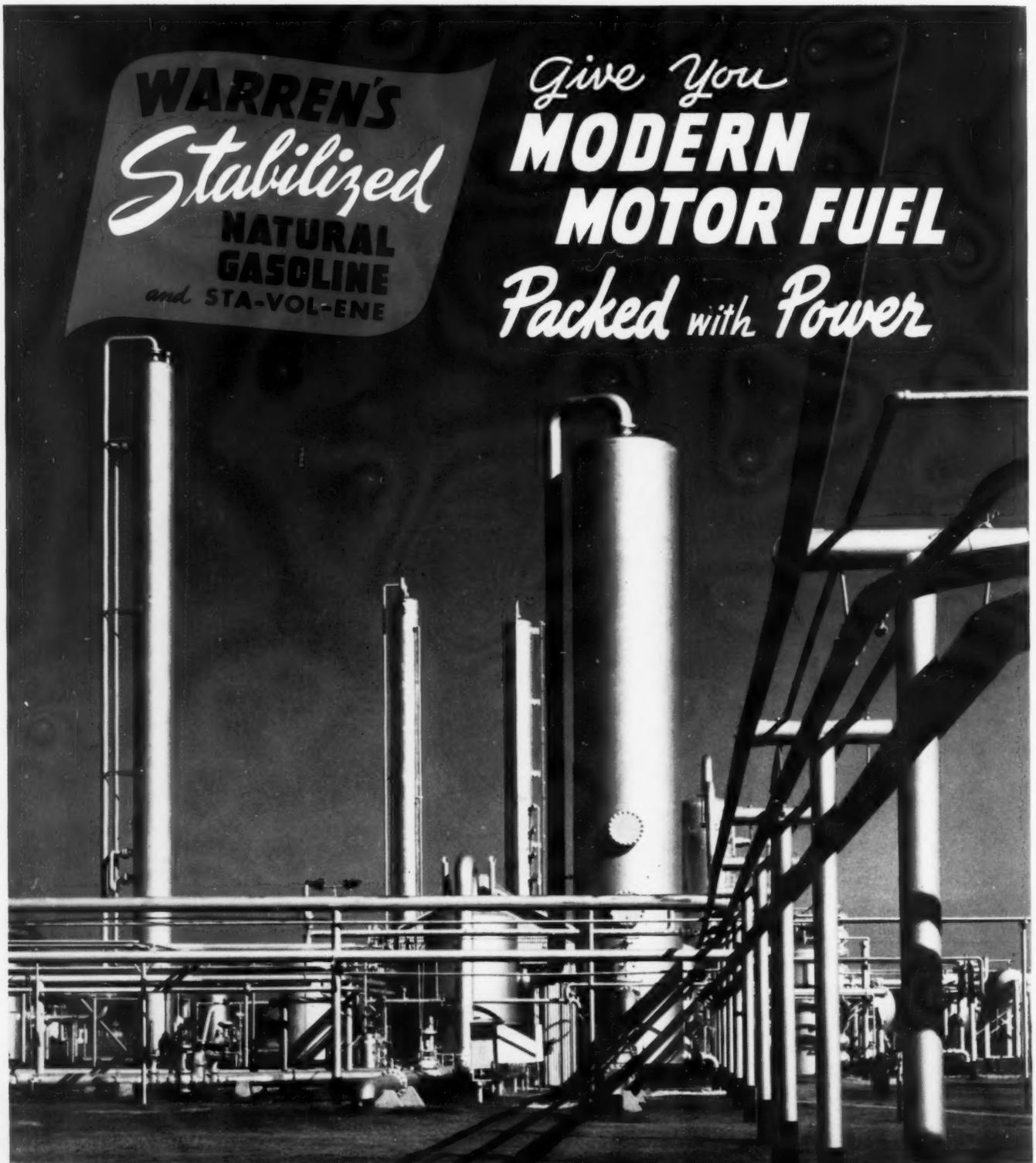


World Petroleum

FIVE DOLLARS PER YEAR FIFTY CENTS PER COPY MAY, 1950



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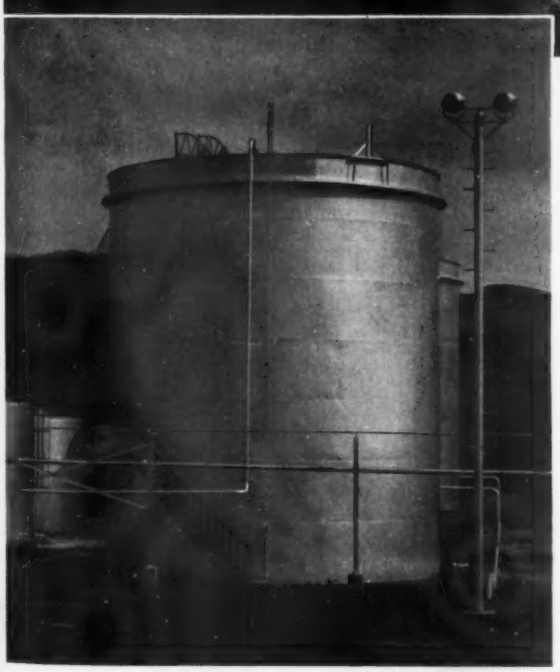
WARREN'S FAIRBANKS, TEXAS PLANT

Crude Oil, Natural Gasoline and Liquefied Petroleum Products

Why are the Storage Tanks so *DIFFERENT*



The Hortonspheres shown above were fabricated in the U. S. and erected at St. Gaudens by our licensee, Constructions Metalliques de Provence. The steel plate portions of the tanks shown above were both fabricated and erected by this licensee.

at this gasoline plant in France?

It is necessary to use the different types of tanks shown in the accompanying views because the Boussens gasoline plant at St. Gaudens, France, produces petroleum hydrocarbons that differ widely in volatility. Product losses during storage and handling would be excessive unless each type was selected to suit the product and service involved.

The Boussens Plant uses natural gas from nearby fields for its feed stock. Products recovered are propane, butane, regular motor gasoline, kerosene, absorption oil, and fuel oil. Here's how the problems involved in storing some of these many products are handled.

The tanks shown at the left are equipped with *Horton Double-Deck Floating Roofs* and store regular motor gasoline. The Double-Deck Floating Roof is recommended for use on tanks storing motor gasoline because it prevents filling evaporation losses and reduces losses caused by breathing or boiling. It quickly pays for itself when used on gasoline tanks filled and emptied more than five or six times per year.

Now how about the *butane?* It is stored in the two 5,000-bbl. *Hortonspheres* shown above. These Hortonspheres are designed for a working pressure of 125 lbs. per sq. in. They are the logical container for storing butanes, butane-propane mixtures, and volatile charging stocks because they . . . prevent evaporation losses . . . reduce the fire hazard . . . cut down corrosion . . . are economical to build.

This example shows why *different* types of storage tanks are used for *different* petroleum products. You will profit by following this practice. It's the best way to store your products safely with the minimum evaporation loss and depreciation of quality. Write our nearest office for information or quotations.

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HOW BIG

SHOULD AN OIL COMPANY BE ?

HERE IS A STRAIGHT ANSWER FROM ONE OF THE OLDEST COMPANIES IN THE INDUSTRY:

Socony-Vacuum is the size that it is — neither the biggest nor the smallest in the Petroleum Industry — because it is an efficient size for the kind of business we do.

Efficiency is the key to a company's size — for it is the key to what the American public wants, the most for its petroleum dollar.

Under the American system of business, a company that operates *inefficiently* soon *loses business* to other companies able to offer the public more value at lower cost. That's how American competition works — and if any company gets so big that efficiencies inherent in mass operation are more than offset by increasing costs — *competition* will cut that company to a proper size.

To put it another way:

A *company* is as strong as its competitive efficiency —

In turn, an *industry* is as strong as its companies —

And in turn, a *nation* is as strong as its industries.

Thus, *every* company, big or little, must be *"big" enough* to serve the best interests of the people in the area it covers!

Since 1866— the Flying Red Horse Companies have practiced *Competitive Efficiency* to supply you with Finest Petroleum products at the lowest possible cost!

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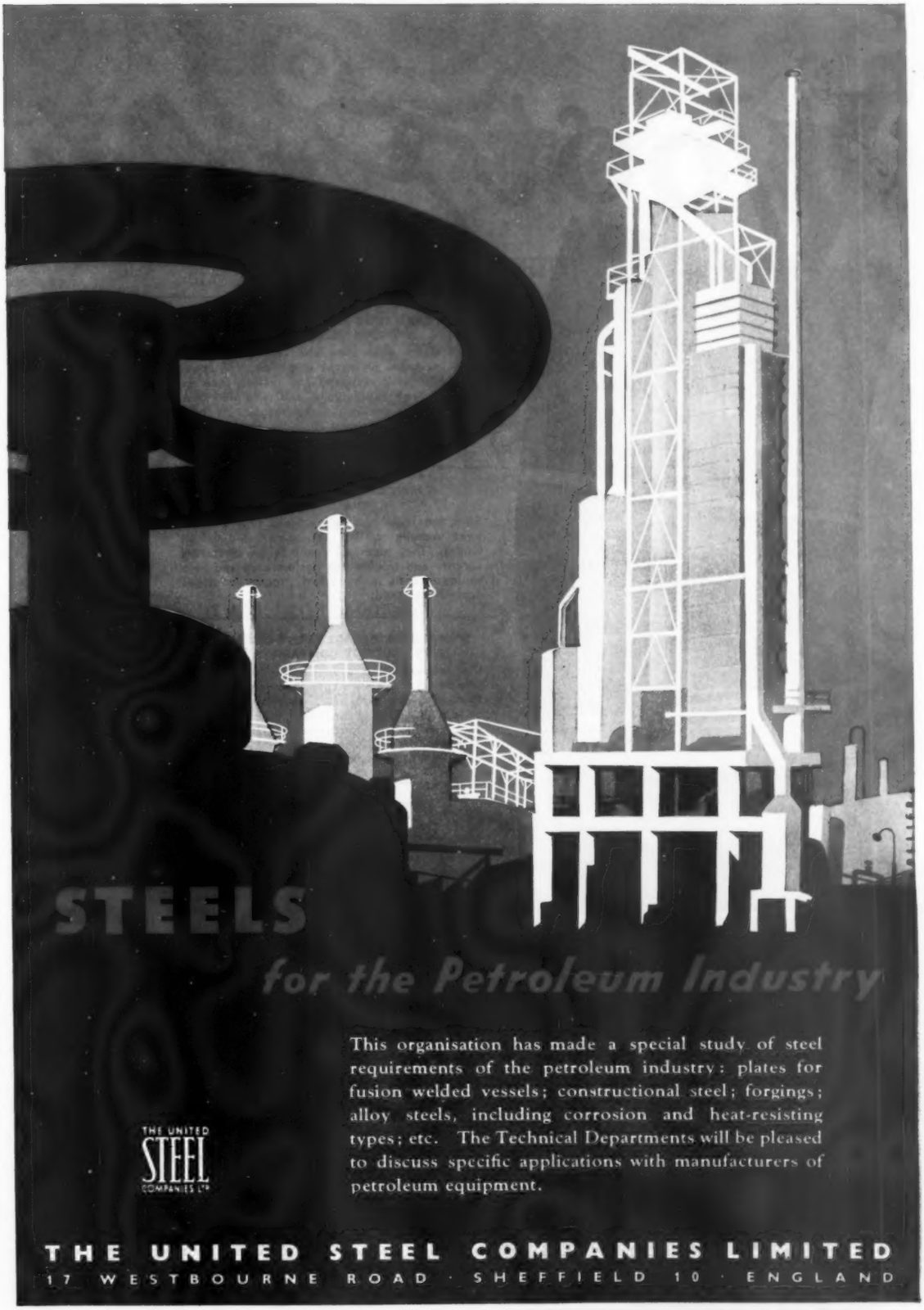
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This organisation has made a special study of steel requirements of the petroleum industry: plates for fusion welded vessels; constructional steel; forgings; alloy steels, including corrosion and heat-resisting types; etc. The Technical Departments will be pleased to discuss specific applications with manufacturers of petroleum equipment.
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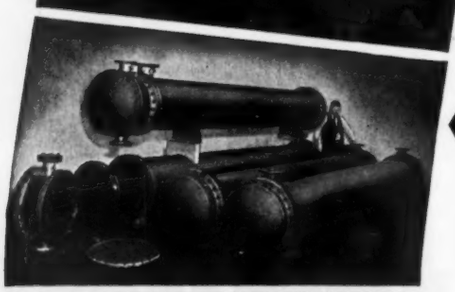
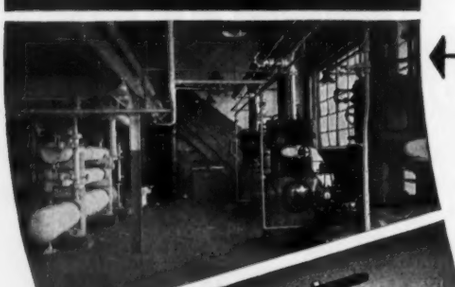
Stills, towers, oil chilling machines, filter presses, heat exchangers, etc. are constructed to all Codes. They meet all demands for operating security and trouble-free performance and help to lower costs in important process industries around the world.



SPECIAL MATERIALS FIGHT CORROSION AND PRODUCT CONTAMINATION

Our modern shops produce a wide variety of equipment made from special metals and alloys to combat corrosion, and product contamination or discoloration. Fabrication procedures employed insure that corrosion resistant properties of welds will match that of the materials from which units are constructed.



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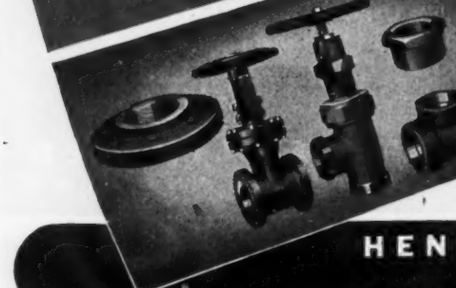
Over 60 years of manufacturing experience, engineering and research stand behind Vogt refrigerating and ice making machinery. Absorption Systems, Compression Systems, and the Automatic Tube-Ice Machine in a wide range of capacities serve in leading petroleum refineries, chemical plants, ice and cold storage plants, dairies, packing plants, etc., at home and abroad.



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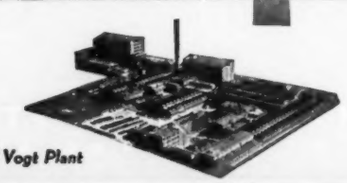

Air View of Vogt Plant

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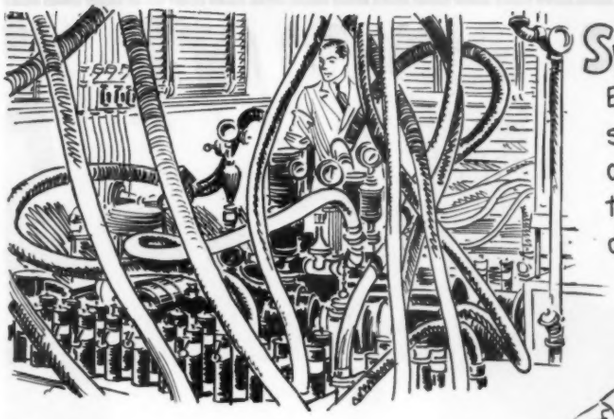
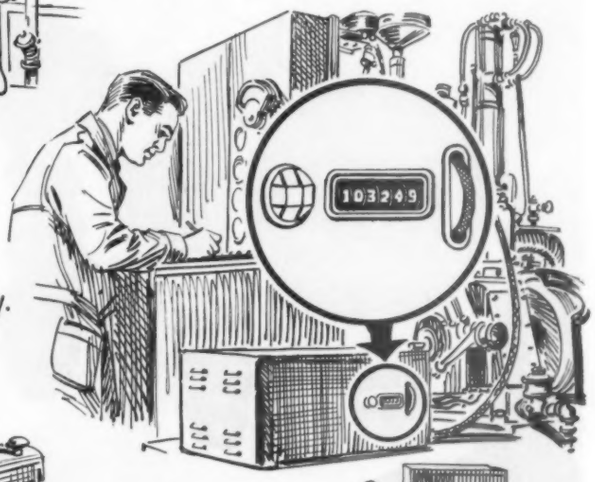
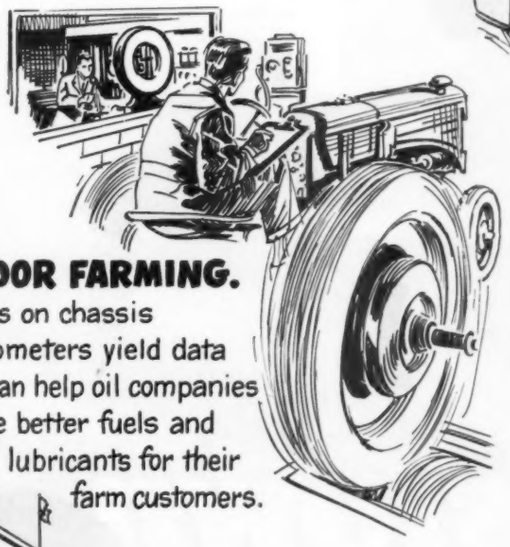
Speaking of Research... by ETHYL



SWITCHBOARD FOR FUELS enables Ethyl engineers to use 32 different fuels simultaneously in dynamometer research on engines. Information secured in these tests and others supplements research of individual refiners.



"WILD PING" is a fuel-engine problem under investigation. This electronic counter automatically totals the number of "wild pings" which occur intermittently.



INDOOR FARMING. Tractors on chassis dynamometers yield data which can help oil companies produce better fuels and lubricants for their farm customers.

HAVE A PROBLEM? Information from 27 years of fuel-engine research is on file at the Ethyl Laboratories ...and is available to refiners.

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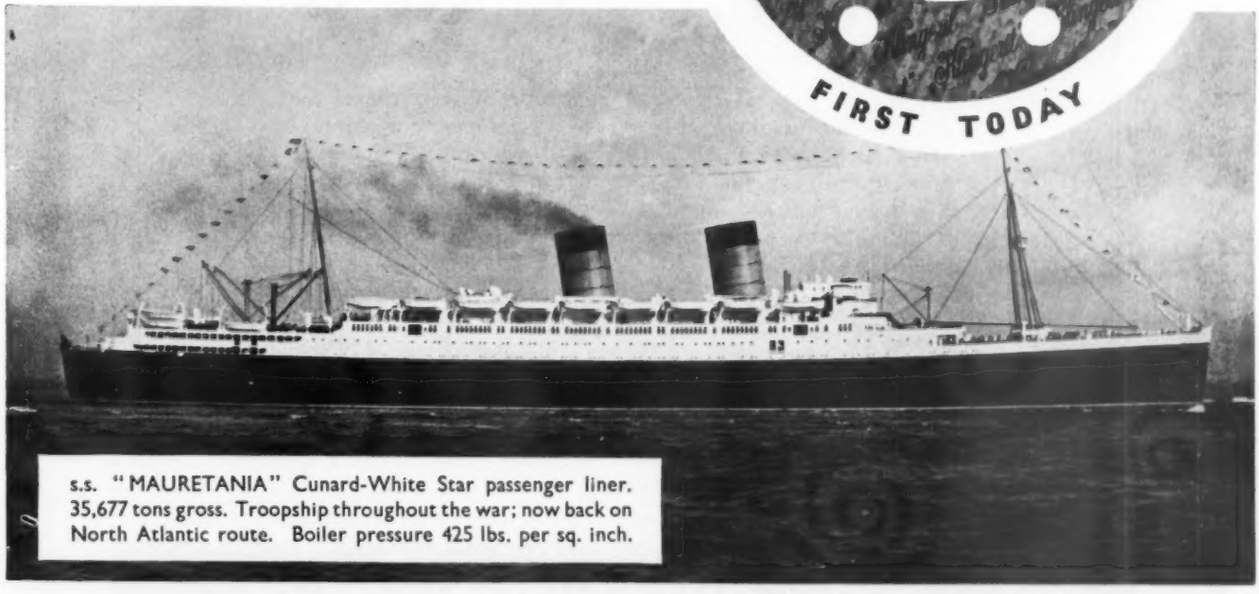

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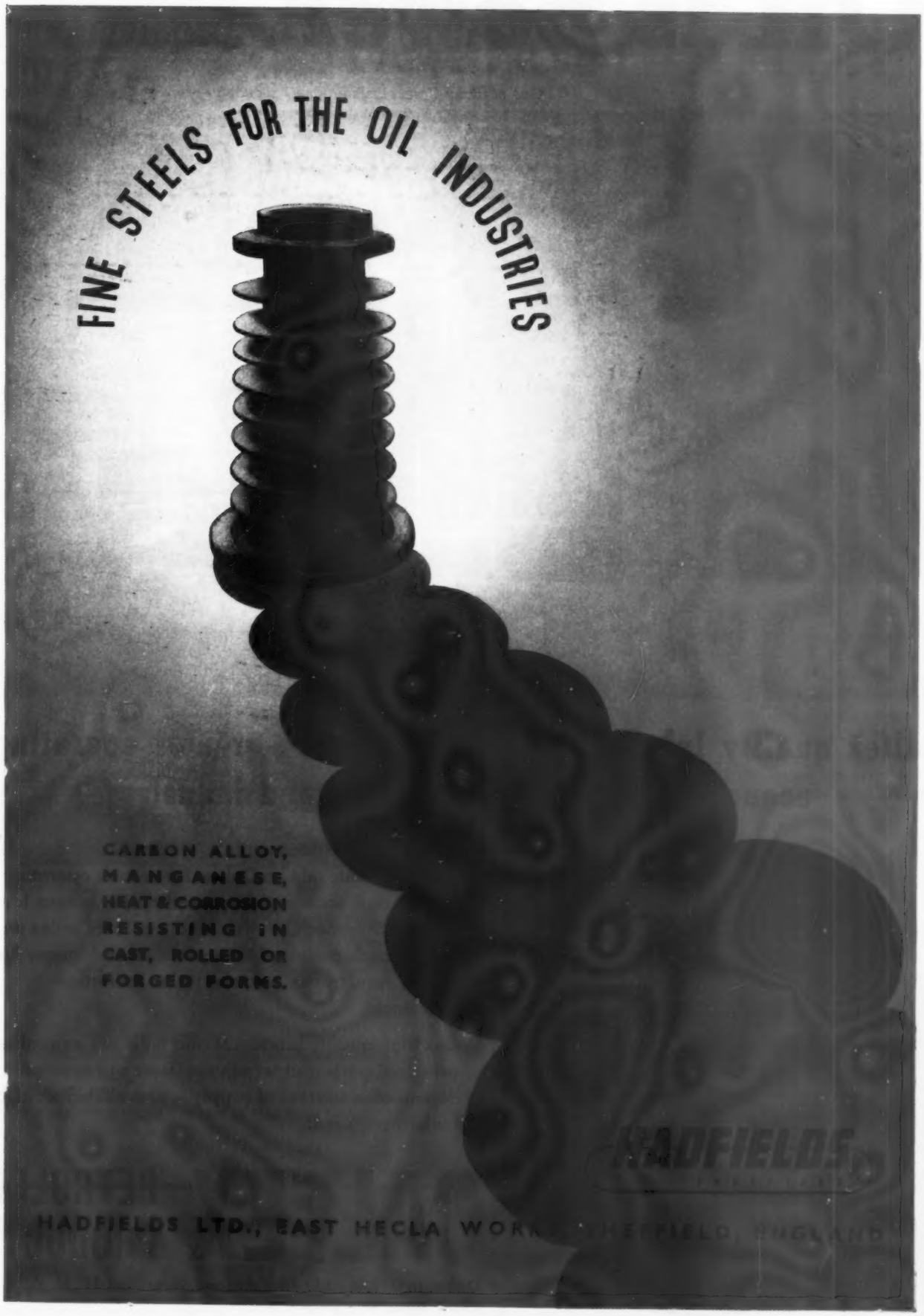
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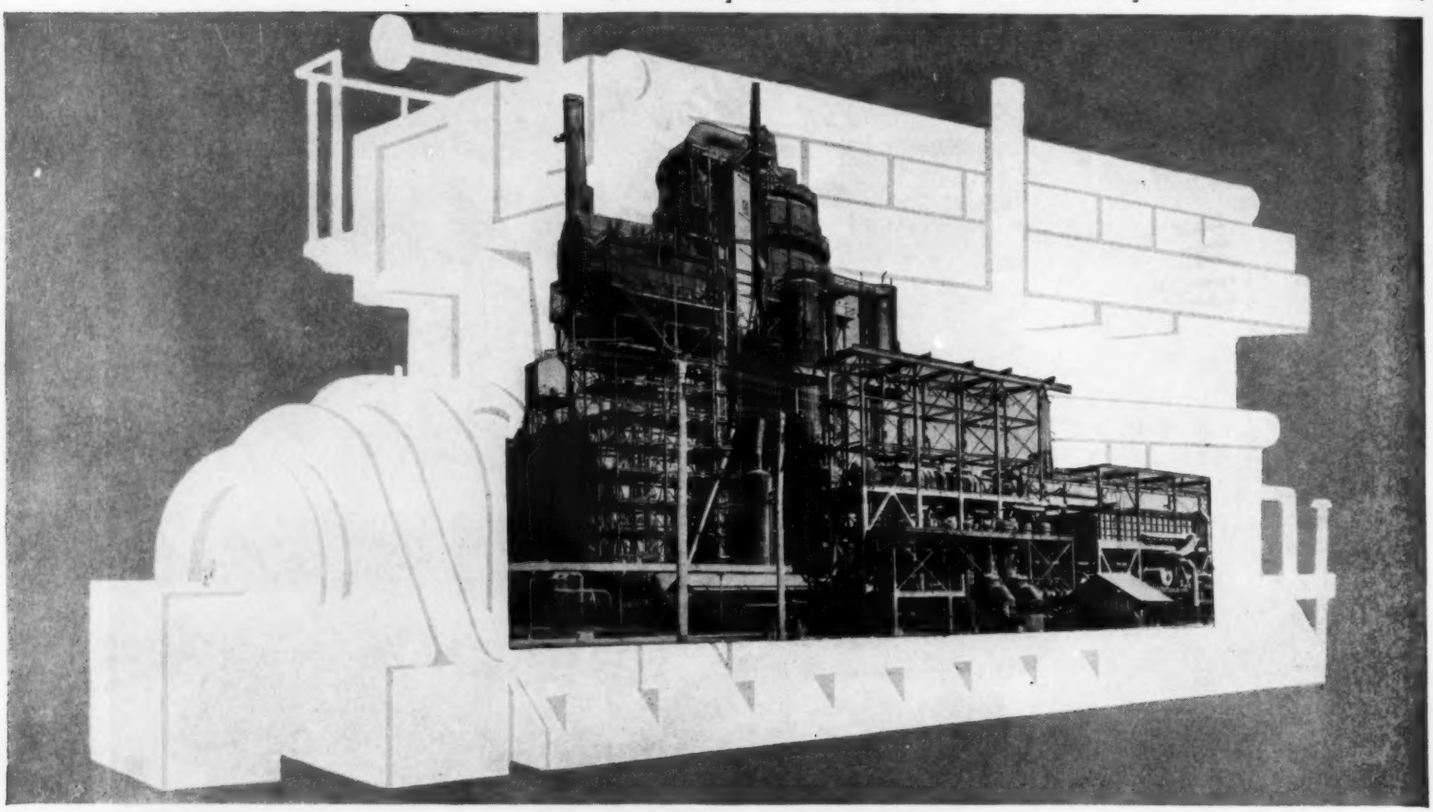
One of many Caltex installations – section of refinery at Bahrein, Persian Gulf...



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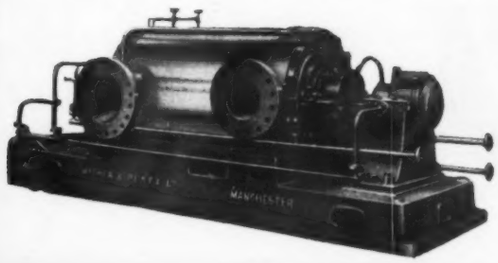
Centrifugal Pumps & FLAMEPROOF MOTORS

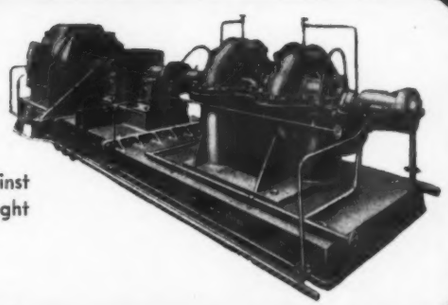
Main Pipeline Pumps....



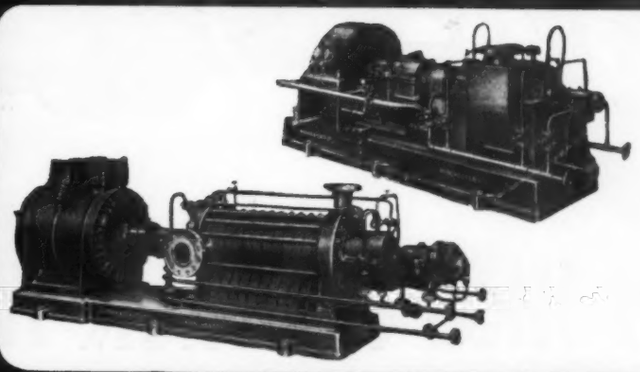
Mather & Platt multi-stage 'Plurovane' pumps were amongst the earliest centrifugal pumps installed for main line work. The pump shown on the left is a typical modern 'Plurovane' designed for a throughput of 50,000 bbls/day of crude oil against a pressure of 750 p.s.i. when running at 1500 r.p.m.

Transfer and Loading Pumps

Our standard ranges include a pump for nearly every transfer or loading duty. The two-stage "Medivane" pump illustrated on the right can handle 700 tons/hr. of crude or products against heads up to 500 ft. It is driven through a gas tight wallbox by a 550 h.p. Mather & Platt Motor.



Refinery Process Pumps



Our long refinery experience at home and abroad enables us to supply pumps for the most arduous refinery duties. The illustration shows typical units:—a steam turbine driven pump handling oil at 500 degs. F. and a motor driven "Plurovane" pump dealing with light volatile hydrocarbons.

Flameproof Motors on Pipeline Duty....

Mather & Platt electrically-driven centrifugal pumps on an oil pipe line. The motors here illustrated are of the totally enclosed flameproof type, and are of 1,000 h.p. capacity, fed from a 3 phase 50 cycle 6000/6600 volt supply. They are squirrel cage direct-on started machines with a starting current of four times full load value.

MATHER & PLATT

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● The expression "Built Like A Mack Truck" was not coined by us. It worked its way into America's everyday language because for 50 years Mack trucks have been an accepted symbol in the public mind for something extra strong and extra rugged.

To truck users in excavating and quarry work, in pit and strip mining, in oil field hauling — "Built Like A Mack Truck" means even more. It means trucks that are built to build profits... designed to give advantages offered by no other make. Powerful Thermodyne and diesel engines! Massive heat-treated frames! Rubber Shock Insulators! Hydraulic Power Steering! Air Assist Clutch! Mack's matchless Balanced Bogie and Power Divider.

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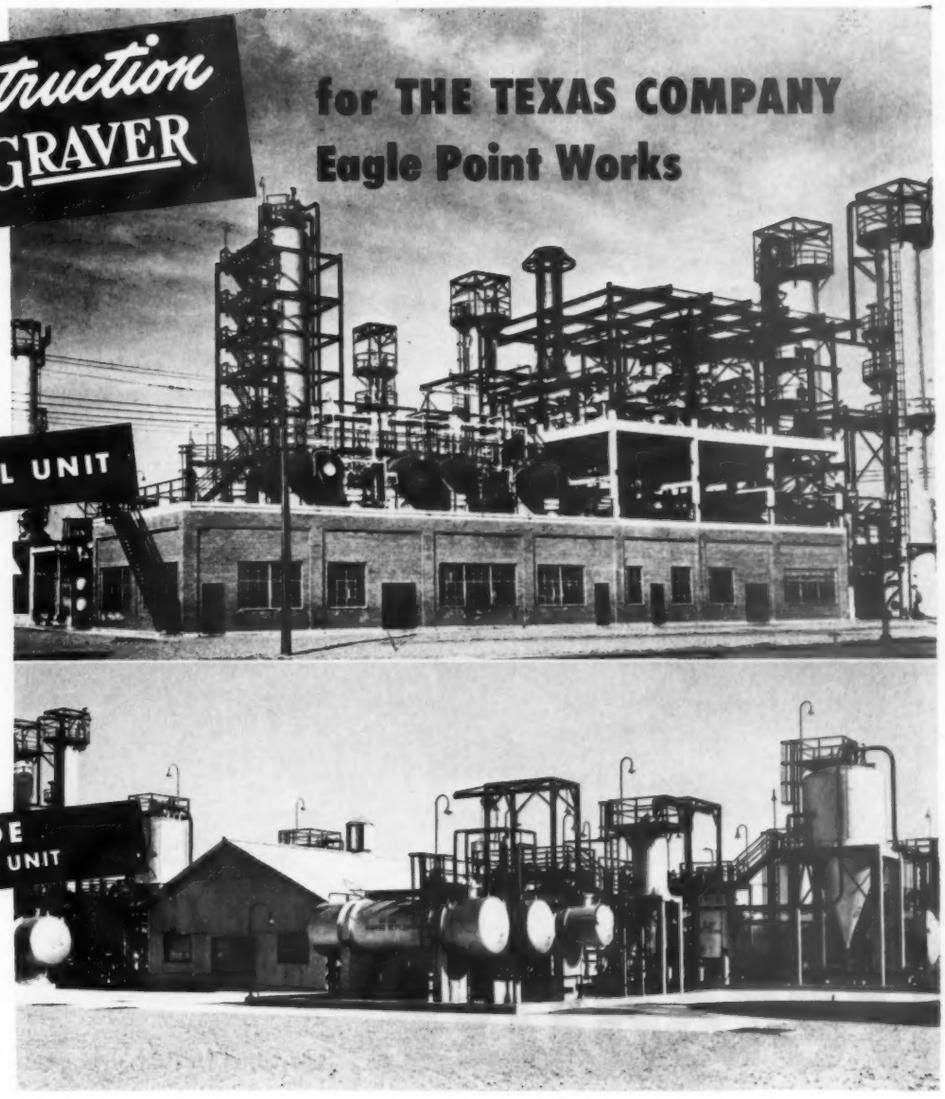
Construction by GRAVER

for THE TEXAS COMPANY
Eagle Point Works



Again it's *construction by Graver* . . . this time, The Texas Company's first large east coast refinery—the multi-million dollar Eagle Point Works at Westville, New Jersey.

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Other Graver construction included five cooling tower basins and pump houses, propane control house, B.S.W. pump house, river pump house, barometric oil separator basin and such miscellaneous jobs as foundations, pipe supports, sewers, manholes, and the handling of all material.

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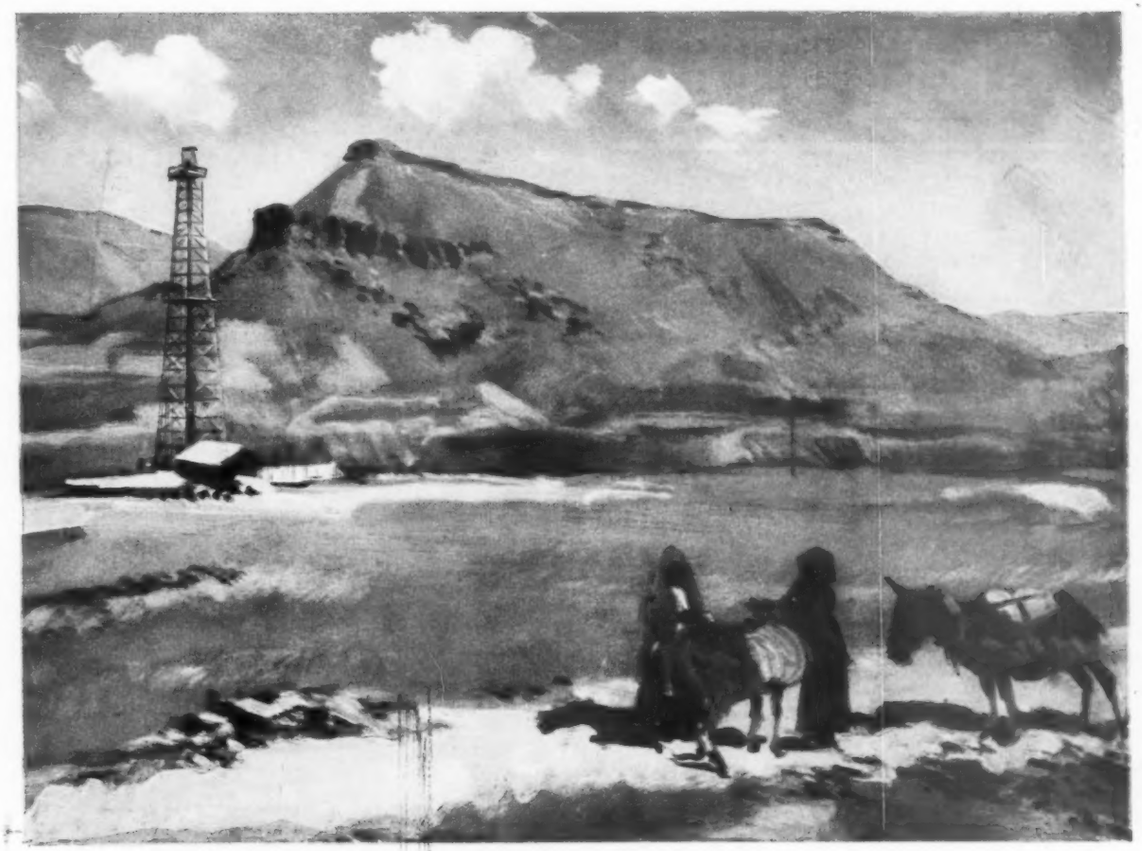

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S & L tubes and
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Many engineers, on seeing the Stewarts and Lloyds film 'The Tube Age', have expressed interest in the uses of steel tubing outside their own range of activities. This advertisement is one of a series illustrating some of the many specialised applications of S & L steel tubes, with which many of our readers may already be familiar.

STEWARTS AND LLOYDS LIMITED

GLASGOW : BIRMINGHAM : LONDON

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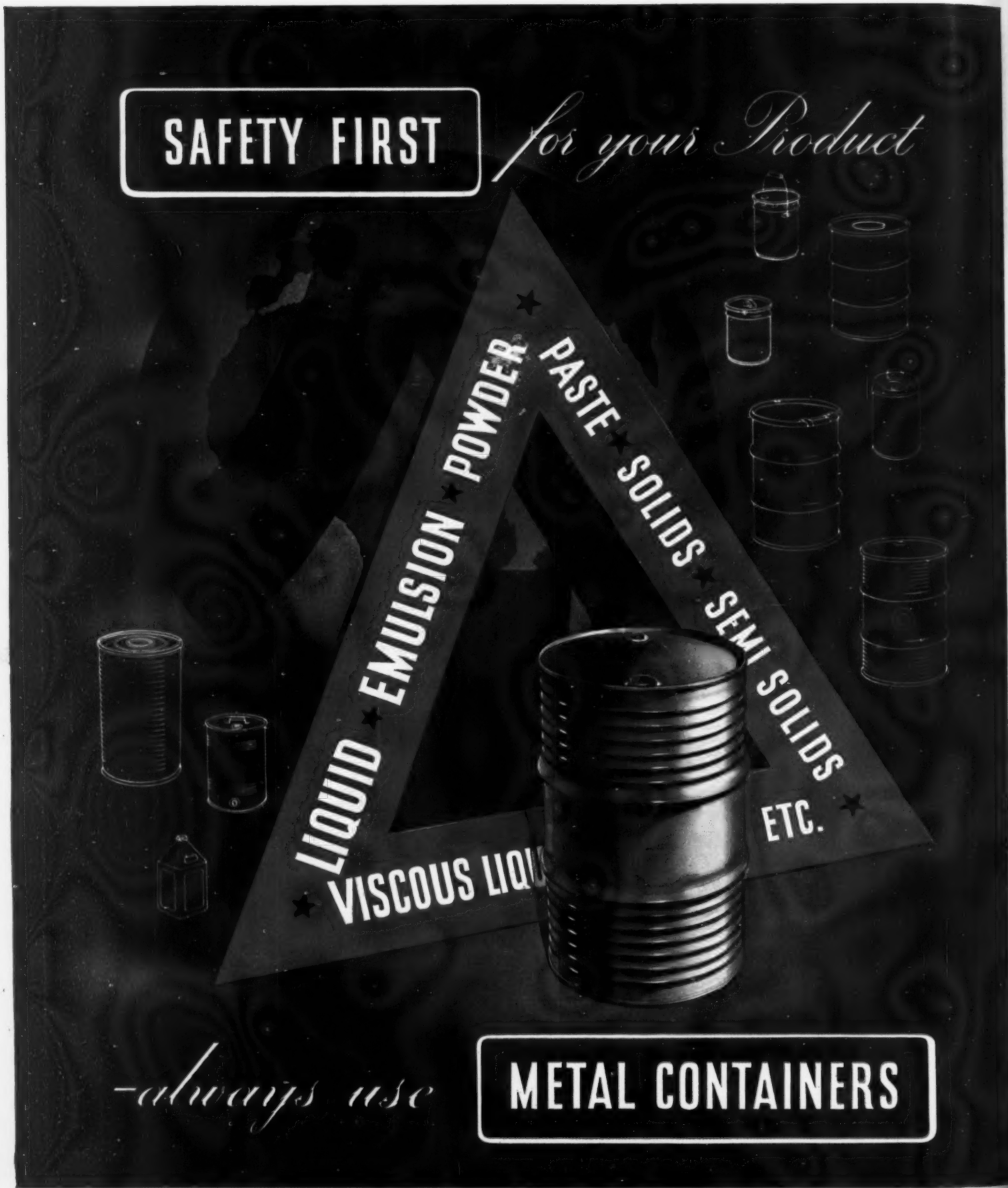

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WORKS: ELLESMERE PORT & RENFREW ASSOCIATED COMPANIES OVERSEAS

CASE HISTORY

How Du Pont Service Solved a Tetraethyl Lead Storage and Handling Problem

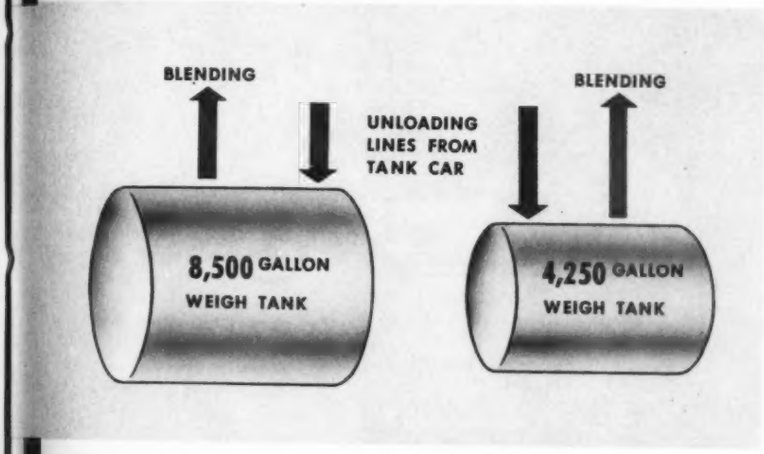
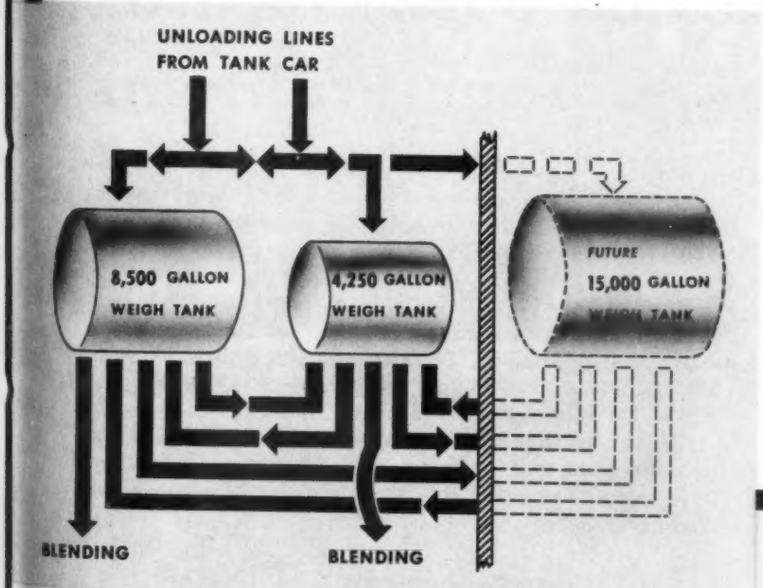


Diagram showing original set-up of TEL weigh tanks in large refinery. Operation of blending plant was inflexible because each tank could only be used individually.



Blending plant diagram after redesign by Du Pont TEL operating division. Complete flexibility was obtained as well as provision for future expansion when desired.

A large refinery was using two tetraethyl lead weigh tanks which had been installed at different times as the plant increased in size. Because each tank had been set up as a separate unit when put in, blending operations were not as flexible as desired.

As demands on the blending equipment increased the refiner sought some method of improving the flexibility of his present TEL blending plant and at the same time provide for the addition of expanded storage and weigh tank facilities.

The Du Pont field representative was called in for his recommendation. After careful analysis of the problem, he made a proposal which:

1. Gave maximum flexibility and economy through modernization of present installation. Provision was made to use existing fittings and other parts wherever possible to keep cost at a minimum.

2. Also provided for future installation of additional weigh tank to handle long range growth. Design enabled new facilities to be hooked into present ones when built, but did not require that money be spent for new storage until needed.

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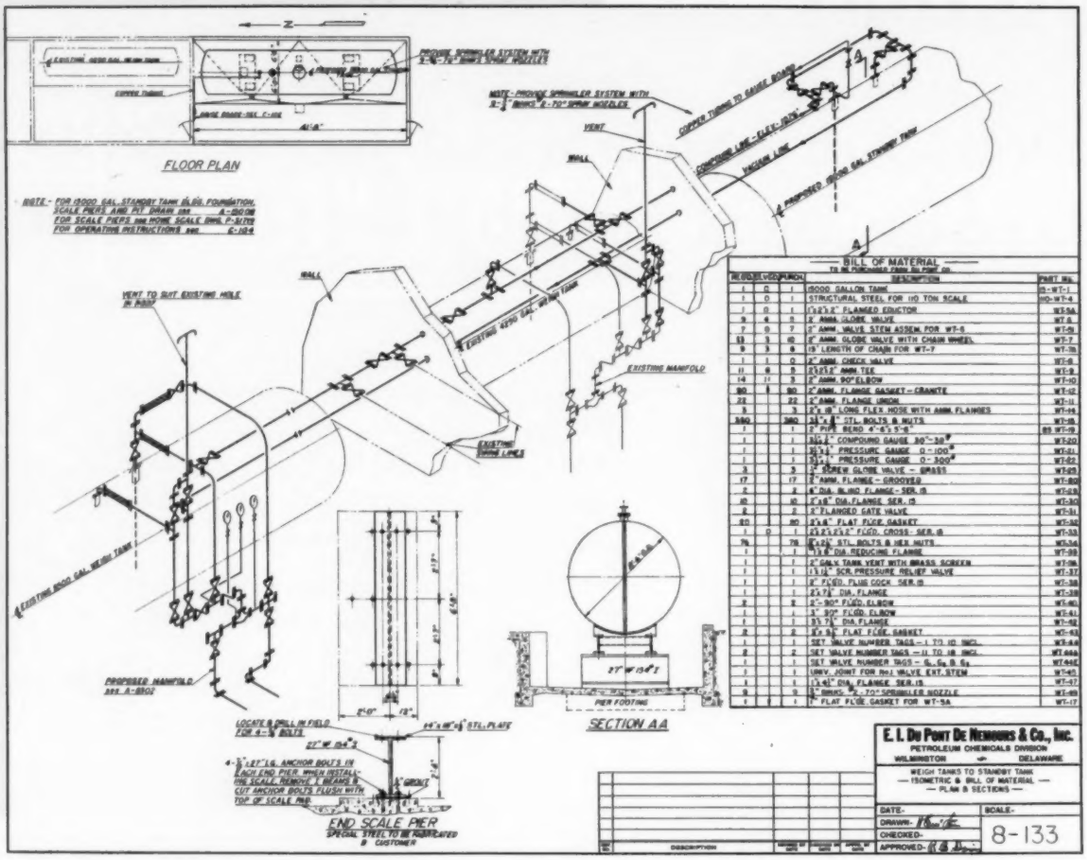

Du Pont provides complete design service for all TEL handling problems. Valves, fittings and other special parts for blending plant construction, repair and modernization may also be obtained from Du Pont.

Du Pont Services Provide Safe, Practical, Economical Solutions to Your Problems

DID YOU KNOW

Du Pont developed "Nitramon" S, a blasting agent for seismic exploration? These special blasting agents which go under the trade names "Nitramon" S and "Nitramon" WW cannot be detonated even with a rifle bullet. They require a special primer. Blasting agents and explosives are only a few of the many Du Pont products used throughout the oil industry from oil location to finished product.

This case history, where the Du Pont field representative was able materially to improve the flexibility of an existing installation, and provide for future expansion is but another example of Du Pont TEL services in action.

Whenever you have a problem involving TEL handling, blending or storage, call your Du Pont Petroleum Chemicals Representative. His recommendation, based on experience in handling a wide variety of such problems, will offer a safe, practical and economical solution.

This is only one of the many services Du Pont provides in connection with its tetraethyl lead compounds. Others are: Safety, Technical, Research, Medical, Marketing and Field Laboratory.

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These are among the leading petroleum companies with Kellogg designed-and-constructed Propane Deasphalting and Decarbonizing units:
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• British American Oil Co., Ltd.
• Cities Service Refining Corp.
• Cie. Francaise de Raffinage
• Gulf Oil Corporation
• Humble Oil & Refining Co.
• Kendall Refining Company
• Mid-Continent Petroleum Co.
• The Pennzoil Company
• Phillips Petroleum Company
• Pure Oil Company
• Shell Oil Company
• Sinclair Refining Company
• Standard Oil Company (Ohio)
• The Texas Company
• Utah Oil Refining Company

4 out of every 5 barrels of Propane-Deasphalted oil are processed in Kellogg-designed units!

Yes! Kellogg has engineered and built over four-fifths of the world's Propane Decarbonizing and Deasphalting capacity . . . and there's more under construction!

WHEN it became obvious years ago that asphalt-free crudes would not meet the growing demand for lubricating oil stocks, development work was started to obtain quality lube stocks from asphaltic crudes. Eventually this development work grew into the familiar JUIK (Jersey-Union-Indiana-Kellogg) series of propane processes, basic among which was Propane Deasphalting. First utilized successfully as a settling process in horizontally-positioned equipment, Kellogg later developed the present counter-current tower method.

Efficient, non-critical in operation, and extremely flexible over a wide range of feed and product specifications, Kellogg engineers subsequently saw in the basic principles of the process an excellent method for reducing the carbon content of cat cracker feed stock, thus increasing the potential capacity of any cat cracker. Kellogg has designed and sold such units since 1942.

As licensing agent for all such projects, and as the designer and builder of more than four-fifths of the world's capacity, M. W. Kellogg offers unduplicated background to refiners considering addition of such facilities.

PILOT PLANTS PLAYED MAJOR ROLE IN PERFECTING PROPANE DEASPHALTING!

If any refining process owes its acceptance to pilot plant work, most certainly it is Propane Deasphalting. Kellogg's first pilot plant for this process was started back in the early thirties. It was followed by others, including the latest pilot unit pictured here. Operating characteristics and economics were so thoroughly investigated on these pilot plants in hundreds of separate runs that widespread commercial acceptance of the process was achieved practically overnight on the basis of pilot plant data.

IT TAKES ALL SEVEN TO PRODUCE GREATER EARNING POWER . . .

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1 THE DEVELOPMENT "TOOLS"
—laboratories, pilot plants and recognized specialists to prove and improve processing and equipment ideas.

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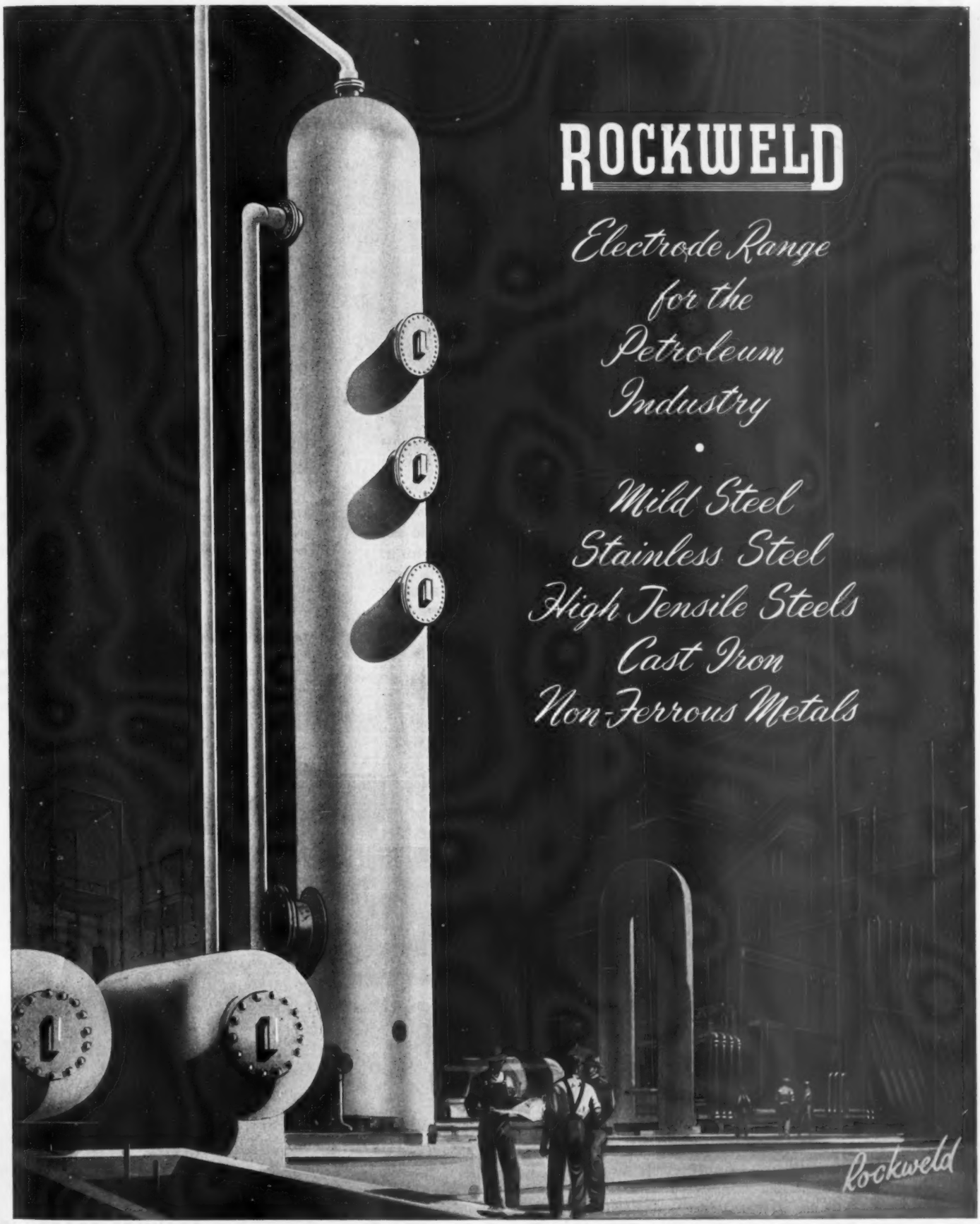

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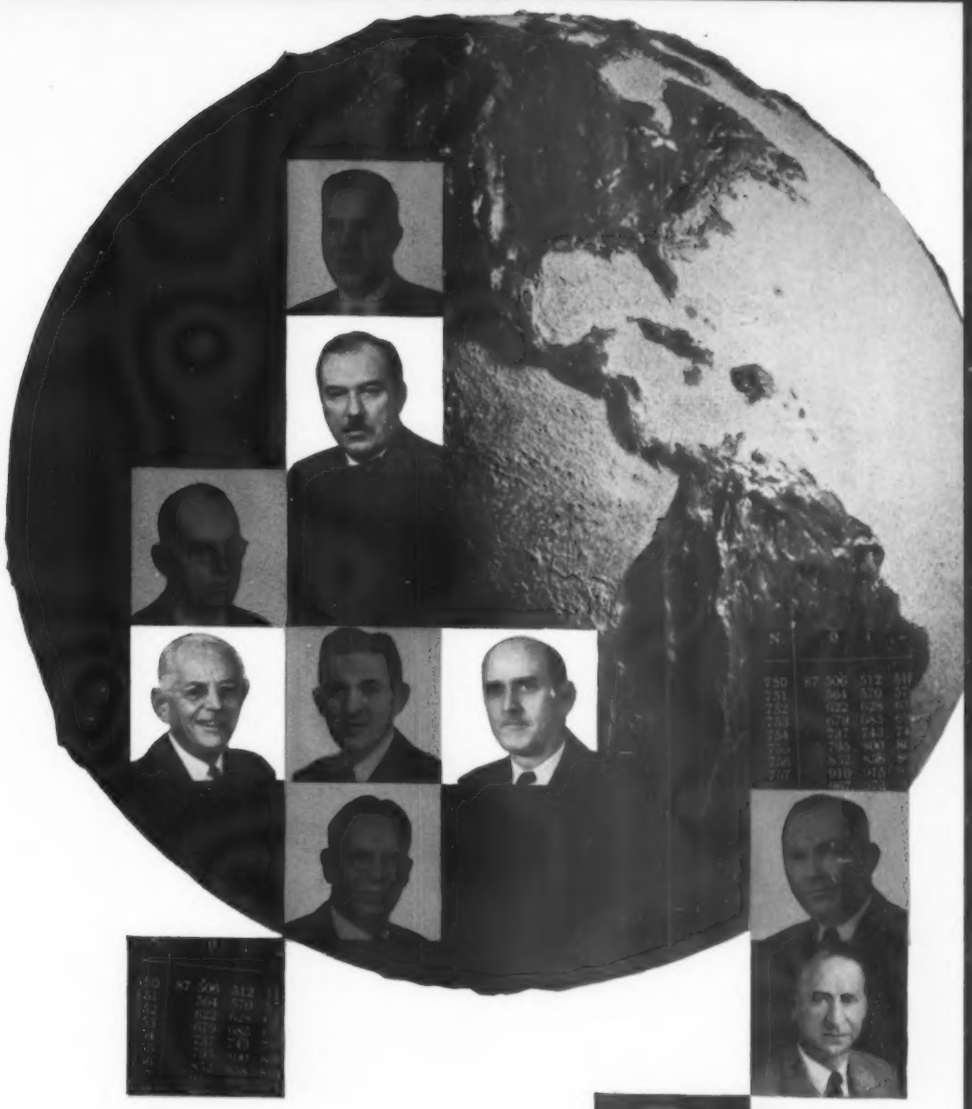

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engaged in project engineering has a well diversified background of practical experience. Directly from a mechanical course at college, he entered the petroleum field and acquired his early experience with an oil company, either in the Engineering Department or in the Operating Department. He joined Lummus approximately 15 years ago, where his experience was extended covering all phases of engineering from laboratory, through design and planning to actual field construction. Concurrently keeping abreast of developments, he has maintained his standing as a licensed professional Engineer.

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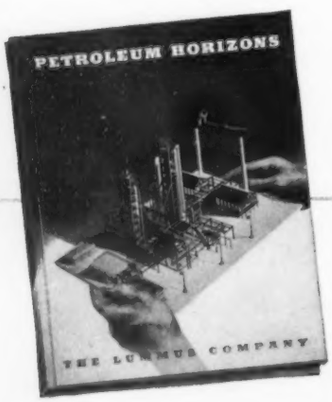

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This Month's Cover

Since the wartime "Big Inch" was laid to avoid the submarine menace and stretch the tanker pool, there have been a good many "Inches" such as the "Little Big Inch," the "Biggest Inch," and more recently the "Toughest Inch." Perhaps the "Toughest" job was that the H. C. Price Co. undertook of laying a 26-inch gas line across West Virginia mountains for The Atlantic Seaboard Corp.

This month's cover picture by E. L. Weaver for International Harvester Co. was taken at the summit of a West Virginia mountain where a slip might have meant a 1,700-foot fall. Color plates were supplied through the courtesy of the editors of the Harvester World.

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FRANK M. PORTER of Oklahoma City has been elected unanimously as the tenth president of the American Petroleum Institute. He succeeds William R. Boyd Jr., who retired last November after nine years in the post. Since Mr. Boyd's retirement, Baird H. Markham has served as acting president, and W. Alton Jones of the Cities Service Co., chairman of the API board of directors, has devoted much of his time to affairs of the Institute.

In recognition of his services as acting president of the Institute since last November, Mr. Markham was elected to membership in the board of directors. He will now devote his entire time to the American Petroleum Industries Committee which he has headed for the past 17 years.

Mr. Porter's name was the only one submitted to the API directorate by a special nominating committee headed by Hines H. Baker, president of Humble Oil & Refining Co.

Association work will be no novelty to Mr. Porter. He has served as president of the Mid-Continent Oil and Gas Association, the general organization of producers in the southwest, for the past four years. This job he will resign.

Mr. Porter will take over his new duties at once. He will continue to maintain his official residence at Oklahoma City and will continue as head of the Fain-Porter Drilling Co. A majority of his time will be spent in New York City in connection with his new API duties.

The new Institute president became an oil man in 1916 when he became a warehouse employee of Dundee Petroleum Co. at Ardmore, Okla. Two years later he became associated with Wirt Franklin, pioneer independent producer. In 1927 he was elected vice president of Wirt Franklin Petroleum Corp. He was in charge of production for the corporation until he organized the Fain-Porter Drilling Co. with Leslie Fain and moved to Oklahoma City in 1940.

The Esso Zurich, first supertanker launched in the United States. Photographs with this article are by Corsini for Standard Oil Co. (N. J.).

TANKER TRENDS

By John F. Roeske

John F. Roeske, Naval Architect, Sun Shipbuilding and Dry Dock Co., Chester, Pa.

WITH a large percentage of the tankers in the new construction program completed or nearing completion, it is interesting to review some of the latest developments in this field, as by these we see the general trend which illustrates the general overall picture. Most prominent features are those involving the design elements of deadweight carrying capacity and speed. The substantial increases in both of these have been influenced by the accelerated petroleum commerce from those ports which have the oil fields of the Middle East and the northern part of South America as their source of supply. The voyage to the Persian Gulf and return is a long haul of 17,000 nautical miles. Therefore, to reduce the transportation cost of oil per barrel, the economics of the problem indicate a larger vessel operating at a higher speed, since other operating factors do not advance directly in proportion to the increase in deadweight and speed, and savings may thereby be effected.

The trend to the so-called supertankers, those of over 20,000 tons deadweight, became apparent at the close of World War II with the construction in the United States of four 23,600-ton ships and later by a 28,000-tonner for the account of National Bulk Carriers Inc. This was followed by European contracts which have been placed since the latter part of 1946, numbering 45 ships and aggregating 1,157,000 deadweight tons. Again in the United States, since the latter part of 1947, contracts have been let for 54 supertankers totaling approximately 1,506,000 tons. The American ships have been classified according to deadweight carrying capacity in three groups: 26,000, 28,000 and 30,000 deadweight tons, and are presented in Table I, together with their principal characteristics.

Table II presents a listing of foreign supertanker construction, and of this group probably 13 vessels will be completed by the end of 1950.

Apparently the end is not yet in sight as tentative plans contemplate tankers of approximately 60,000 deadweight tons, which would require a length of about 760 feet.

Table I—Supertankers Built and Building in the United States

26,000 Deadweight Tons

600′ x 82′-6″ x 42′-6″ — Machinery Single Screw
13750 S.H.P. (Maximum)
Trial Speed — 17 Knots

Name	Owner	Dwt.
Builder: Sun Shipbuilding & Dry Dock Co.		
ESSO ZURICH	Standard Oil Co. (N. J.)	26,555
KUWAIT	Kupan Transport Co.	26,878
IMPERIAL ALBERTA	Imperial Oil Shipping Co. Ltd.	26,525
RAS AL ARDH	Kupan Transport Co.	26,855
SOVAC PEGASUS	Tankers Navigation Co., Inc.	27,003
SOVAC ALADDIN	Tankers Navigation Co., Inc.	27,006
SOVAC ASTRAL	Tankers Navigation Co., Inc.	27,010
SOVAC BRILLIANT	Tankers Navigation Co., Inc.	27,008
SOVAC COMET	Tankers Navigation Co., Inc.	27,025
SOVAC DAYLIGHT	Tankers Navigation Co., Inc.	27,028*
SOVAC RADIANT	Tankers Navigation Co., Inc.	27,010*
Builder: Newport News Shipbuilding & Dry Dock Co.		
ESSO SUEZ	Standard Oil Co. (N. J.)	26,759
ESSO MONTIVIDEO	Panama Transport Co.	26,809
ESSO CRISTOBAL	Panama Transport Co.	26,821
ESSO STOCKHOLM	Panama Transport Co.	26,821
ESSO GENOVA	Panama Transport Co.	26,759
ESSO LIMA	Panama Transport Co.	26,759
ESSO BERMUDA	Panama Transport Co.	26,759*
ATLANTIC EMPEROR	Atlantic Oil Carriers	26,868
Cont. 483	Panama Transport Co.	26,759*
Cont. 484	Panama Transport Co.	26,759*
Cont. 485	Panama Transport Co.	26,759*

Total = 22 Ships Number Completed = 17
*Estimated

28,000 Deadweight Tons

595′ x 84′ x 44′ — Machinery Single Screw
13750 S.H.P. (Maximum)
Trial Speed — 17 Knots

Name	Owner	Dwt.
Builder: Bethlehem Steel Co., Quincy, Mass.		
PENNSYLVANIA	The Texas Co.	28,081
TEXAS	The Texas Co.	28,081
OHIO	The Texas Co.	28,081
KENTUCKY	The Texas Co.	28,081
WORLD LIBERTY	World Tanker Co.	28,352
CAPSA	Atlas Tankers Inc.	28,000*
Cont. 1614	Atlas Tankers Inc.	28,000*
Cont. 1615	Atlas Tankers Inc.	28,000*
Cont. 1616	Atlas Tankers Inc.	28,000*
Cont. 1617	Atlas Tankers Inc.	28,000*
Builder: Bethlehem Steel Co., Sparrows Point		
JAHRA	Kupan Transport Co.	28,336
UBRGAN	Afran Transport Co.	28,336
OLYMPIC TORCH	Olympic Oil Lines	28,385
OLYMPIC STAR	Olympic Oil Lines	28,385
OLYMPIC LAUREL	Olympic Oil Lines	28,385
CORO	Afran Transport Co.	28,336
SAN TOME	Afran Transport Co.	28,336
Cont. 4474	Olympic Oil Lines	28,385*
Cont. 4475	Olympic Oil Lines	28,385*
Cont. 4480	Foreign Tankship Corp.	28,000*
Cont. 4481	Foreign Tankship Corp.	28,000*
Cont. 4482	Foreign Tankship Corp.	28,000*
Cont. 4483	Foreign Tankship Corp.	28,000*
Cont. 4484	Foreign Tankship Corp.	28,000*

Total = 24 Ships Number Completed = 13
*Estimated

30,000 Deadweight Tons

615′ x 84′ x 43′-9″ — Machinery Single Screw
17,600 S.H.P. (Maximum)
Trial Speed — 18 Knots

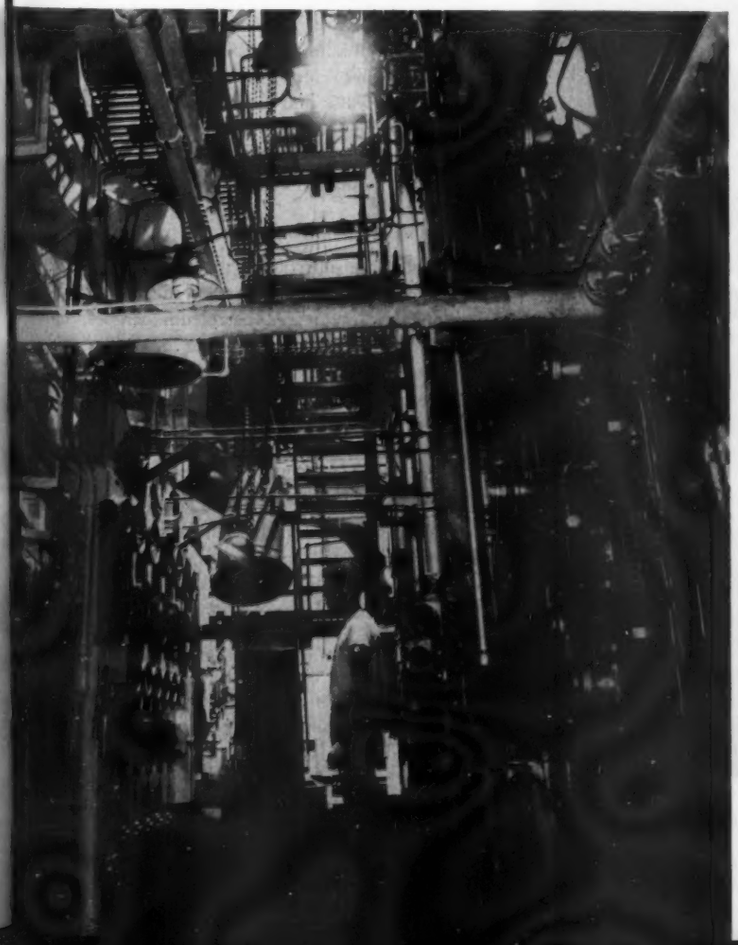
Name	Owner	Dwt.
Builder: Welding Shipyards, Inc.		
BULKPETROL	Oceanic Tankships, S. A.	29,950
BULKOIL	Oceanic Tankships, S. A.	30,006
BULKOCEANIC	Universe Tankships, Inc.	29,950
BULKSTAR	Universe Tankships, Inc.	29,950
Contract 28	Universe Tankships, Inc.	30,000*

625′ x 84′ x 45′ — Machinery Single Screw
18,000 S.H.P.

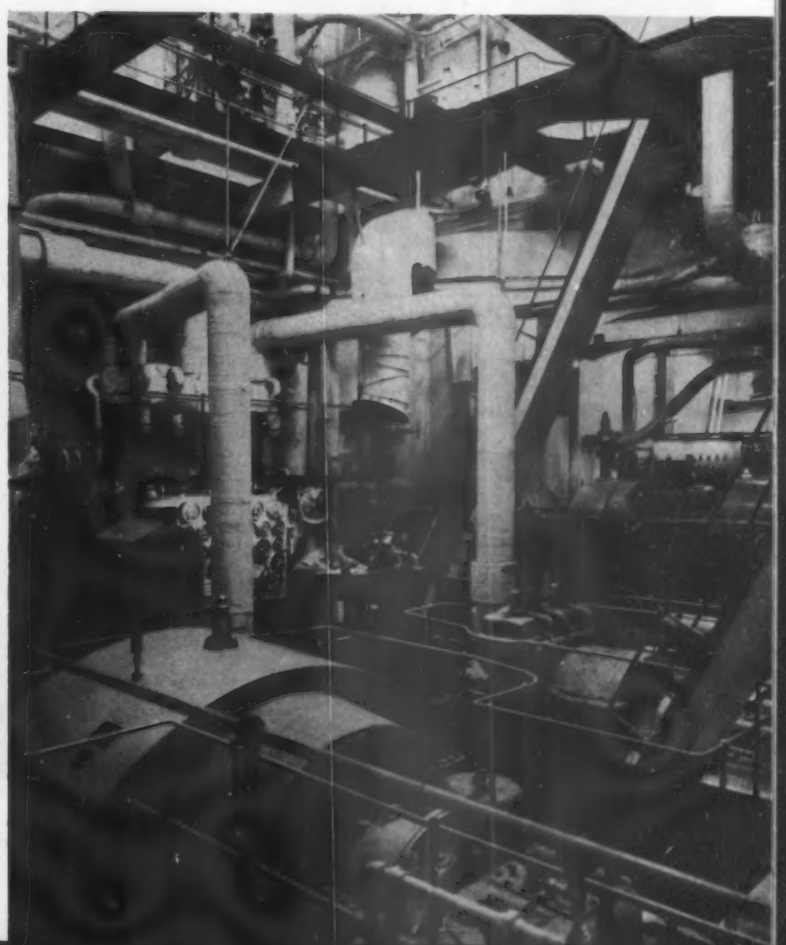
Name	Owner	Dwt.
Builder: New York Shipbuilding Corp.		
Cont. 482	Philadelphia Tankers, Inc.	30,000*
Cont. 483	Philadelphia Tankers, Inc.	30,000*
Cont. 484	Philadelphia Tankers, Inc.	30,000*

Total = 8 Ships Number Completed = 4
*Estimated

Boiler room of Esso Zurich showing transverse firing aisle forward of boilers. Gauge board is at left.



Engine room at operating platform level looking forward. Low and high pressure turbines in foreground. Switchboard and turbo generators at far right.



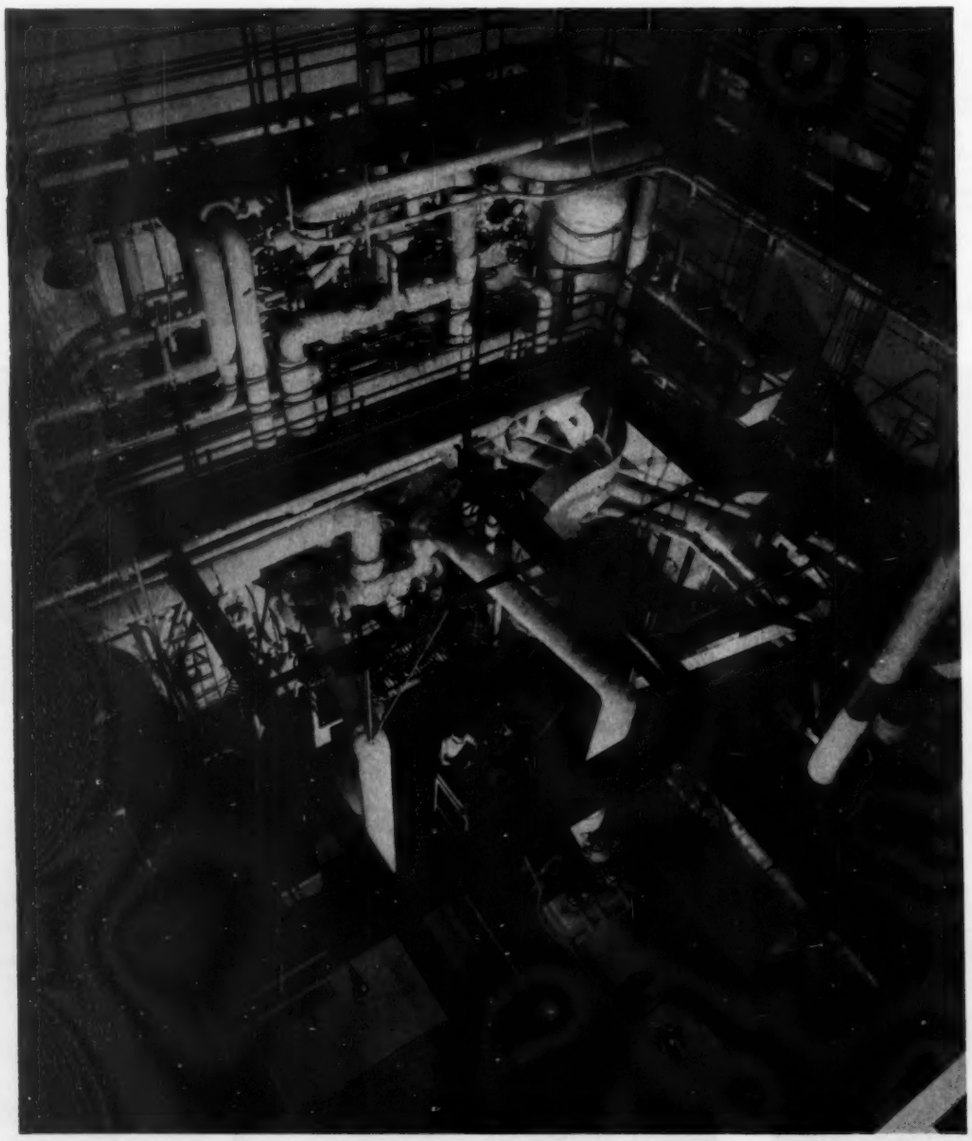
With an increase in length there should be proportionate increases in elements of beam, depth and draft to produce an economical ship of requisite strength and stability.

The ships under construction abroad have generally been propelled by diesel engines of 6,000 to 8,500 BHP, driving the ships at speeds ranging from 14 to 15 knots, examples of which are the MS "C. J. Hambro" of 24,900 deadweight, 6,800 BHP, 14 knots; and the MS "Atlantic Queen" of 23,450 deadweight, 8,250 BHP, 14¾ knots. In the United States the prime movers have been geared steam turbines, upwards of 12,500 SHP, and the speed range is 16 to 18 knots. The concentration of propulsive power on a single screw is a continued practice. Considerable accent has been placed on heat recovery in the thermodynamics of the steam plant with reflected savings in the fuel consumption, so that fuel rates are presently in the neighborhood of 0.52 to 0.58 pounds per SHP hour. This is obviously an advantage in the competition with older ships having a high fuel rate. Steam conditions generally have been advanced, and pressures vary from 600 to 850 psig and temperatures from 800° F to 1000° F.

To reduce the amount of fresh water carried for food and culinary purposes, the American supertankers are fitted with evaporators. For the long voyage to the Middle East this results in a substantial gain in cargo deadweight and accordingly in earning capacity.

Table II—Foreign Supertankers

Shipbuilder	No. of Ships	Dwt. Per Ship	Completion Dates
A. B. Götaverken	3	23,000	1 in '48
Sir Jas. Laing & Sons, Ltd.	2	23,000	1 in '50
John Crown & Sons	1	23,000	
Kockums Mek. Verkstaads	5	24,400	2 in '50
Harland & Wolff, Ltd.	4	24,400	1 in '50
Ericksberg Mek. Verk. A/B	2	24,400	
Furness S. B. Co., Ltd.	9	24,500	2 in '49
			3 in '50
Vickers-Armstrongs, Ltd.	3	24,500	
Swan, Hunter & Wigham Richardson, Ltd.	1	26,000	
C. R. A. Monfalcone	1	26,000	
Swan, Hunter & Wigham Richardson, Ltd.	3	28,000	1 in '50
Harland & Wolff, Ltd.	2	28,000	1 in '50
Cammell Laird & Co., Ltd.	2	28,000	1 in '50
Vickers-Armstrongs, Ltd.	1	28,000	
Hawthorn, Leslie & Co., Ltd.	1	28,000	
Fairfield S. & E. Co., Ltd.	1	28,000	
Vickers-Armstrongs, Ltd.	2	31,000	
Ch. et Atelier de St. Nazaire Penhoet	2	31,000	
Totals	45		



Engine room of Esso Zurich from level of upper deck grating looking down and forward. Main turbines are in foreground, main steam piping in middle foreground.

American practice favors the location of the cargo pump room at the aft end of the oil space, because the natural trim of the ship assists the pumps in the draining of tanks and because motors for electrically driven pumps may be located in the propulsion machinery space. This obviates the need for a deep-well type pump with motor in a separate enclosure on deck. The average pumping time for the supertankers runs from eight to 12 hours.

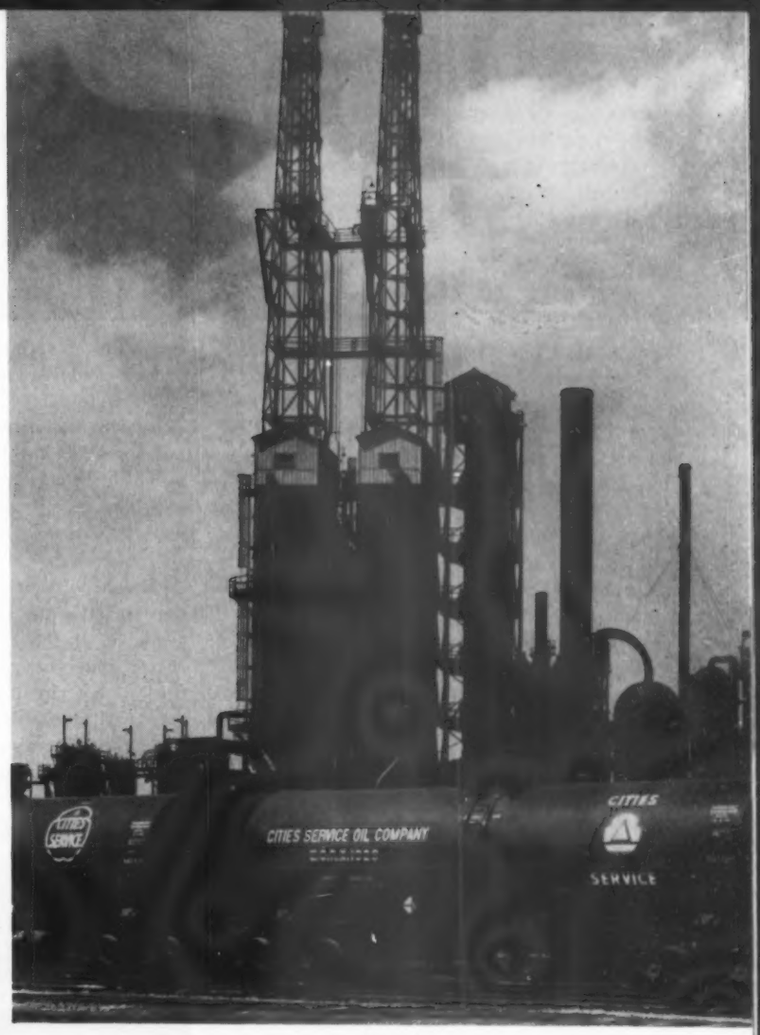
Greater attention is being given to welding procedure, sequence, assembly methods and details. Soft toe bracket connections are being employed to prevent cracks in bulkhead plating etc., due to working at the "hard spots."

There has been a limited application of aluminum for tanker work, chiefly in such fittings as hatch covers, gangways and accommodation ladders. A reduction in the basic price of aluminum and the ability to make good welds in place of riveting would result in wider applications for this metal.

Apart from the supertanker program is the trend to develop tankers with a greater degree of subdivision to carry mixed petroleum cargoes, including as many as six or eight grades in one consignment, such as aviation gasoline, premium gasoline, kerosene, lubricating oils, furnace oils, thinners, detergents, etc. These vessels make part deliveries of the so-called "mixed cargoes" at many ports of call, and, although the relative quantity of each grade may be small, it is very valuable as delivered in the refined state. Accordingly the bulkhead structure, and in many cases cofferdams, pumping systems, etc., must be arranged to avoid the danger of contamination of these products.

The transportation of liquefied petroleum gas (LPG) presents another aspect of the above conditions. The gas is liquefied at a pressure up to about 250 psig and is carried in heavy steel cylindrical containers that are fitted within the main cargo tanks.

RECENT DEVELOPMENTS IN PROCESSING EQUIPMENT



Delayed coking unit installed at the East Chicago refinery of Cities Service Oil Co. as part of its post-war modernization program.

By W. Edward Lemen

W. Edward Lemen, manager of the Petroleum Division, J. F. Pritchard & Co., Kansas City, Mo.

THE past year saw the completion of many major expansion projects in the refining industry within the United States and although refinery construction continued at a high level, it was characterized by the installation of processing equipment designed primarily to improve product quality and to improve product distribution and flexibility of operation. This trend was stimullated by the fact that the refining capacity was built up to the point where the supply of finished products was in excess of the demand.

The expansion of refining capacity outside of the United States, and particularly in the United Kingdom, continued at an accelerated rate during the past year. This current expansion has shifted from the installation of processing equipment designed to give maximum capacity to meet the immediate demand for products with minimum investment and construction time, to the installation of processing equipment designed to improve product quality and operating efficiency. Installations in Europe during the early post-war period consisted primarily of crude fractionation and thermal reforming for improving the octane rating of the straightrun gasoline to give a marketable product. More recent projects now under construction include catalytic cracking for producing higher quality gasoline and solvent refining to produce high quality lube oils.

In spite of the trend toward lower profits from refining due to the price of crude oil remaining practically fixed while the price received for finished products declined, many catalytic cracking units have been installed in the past year. This trend has been stimulated primarily by the general increase in octane rating of motor gasoline, together with a schift to specifying octane on the basis of the research method of rating gasoline octane. Gasoline octanes in general have increased from 86 to 88 research for premium gasoline and from 80 to 82 research for regular gasoline. Some premium gasolines marketed are as high as 93-94 research octane. Catalytic cracking inherently produces gasoline having a high research octane blending value and high sensitivity or spread between motor method octane and research octane rating.

Other factors favoring the installation of catalytic cracking units include high liquid volume recovery, reduction of heavy No. 6 fuel oil production, and conversion of heavy oils to lower boiling distillate fuels. Capacity limits for catalytic cracking units installed in the past year have been extended in both directions ranging from a 1,500-barrel-per-day unit installed by the Panhandle Producing and Refining Company at Wichita Falls, Texas, to a 41,000 barrel per day unit at the Esso Standard Oil Company refinery at Bayway, New Jersey.

Two types of catalytic cracking units have been installed; the fluid catalytic cracking unit and the Houdriflow unit. Recent improvements in the fluid process have resulted mainly in the reduction of installation cost and improvement in operating efficiency. Single units have been operated for approximately two years on stream without shutting down for major repairs. Although not a recent development, it is well to point out that the elimination of the electrical precipitator for the recovery for catalyst fines by the use of microspherical catalyst in the fluid units, together with the simplification of the flow by elimination of one of the catalyst-carrying lines and the consolidation of the reactor and regenerator into a single shell, has greatly increased the feasibility of small capacity units.

The development of the Houdriflow unit and a similar improvement of the Thermofor catalytic cracking process by the Socony-Vacuum Oil Company has resulted in greatly increasing the operating flexibility of these processes. This development consists primarily of elimination of the mechanical elevators used in transporting the catalyst in the older Thermofor process and using a flue gas or a steam and air lift to circulate

catalyst. The equipment has been further simplified as in the case of fluid catalytic cracking by consolidating the reactor and regenerator into a single shell, thereby reducing steel required in the structure and in piping.

One interesting development in refinery design, and particularly catalytic cracking, is the unit installed by the Continental Oil Company at Billings, Montana. This refinery was designed to process a low-gravity, high-sulfur Elk Basin crude oil (23° API, 2% sulfur) in an area where the demand for residual fuel is low. To minimize the production of residual fuel, propane deasphalting of residual crude is used to produce the maximum quantity of clean charge stock for catalytic cracking. This stock is processed in one reactor of a two-reactor fluid catalytic cracking unit using a high conversion recycle operation in which only about 20% of the oil charged is withdrawn as cracked gas oil or cycle stock, the remainder being converted to gas, gasoline, and coke. The second reactor is used for the desulfurization of a fraction containing all of the straightrun gasoline and distillate boiling up to about 600° F. end-point. This fraction is processed at about 700° F. for sulfur reduction and the vapor stream from the desulfurization reactor is fractionated in a separate tower. A single regenerator serves both cracking and desulfurization reactors with separate streams of the same catalyst flowing to each reactor at rates controlled to give the desired operating temperature. Installations of process equipment to improve octane rating of straightrun gasoline with one notable exception, have been more or less conventional thermal reforming units of Cycloversion catalytic reforming units which utilize bauxite as the catalyst to give combined desulfurization and reforming.

A new catalytic reforming process known as "Platforming," which takes its name from the catalyst which contains a platinum compound, has been made available recently. The first commercial unit was installed by the Old Dutch Refining Company at Muskegon, Michigan. This unit has a nominal charge capacity of 1,500 barrels daily of low octane Michigan straightrun gasoline. This process is of particular interest because of its ability to convert low octane straightrun naphtha fractions to higher octane gasolines than can be obtained by thermal reforming with high recovery of liquid gasoline product. This process is of particular interest in connection with natural gasoline and cycling plant operations where the problem of upgrading the gasoline to a marketable product is becoming more serious as the gasoline octane requirement arises. The process operates at relatively high pressure and temperature with recirculating of the high hydrogen content off-gas produced in reforming to suppress coke formation and thus eliminate the need for regeneration of the catalyst.

Several catalytic polymerization units have been installed in refineries that had not already included such facilities, to produce high octane blending value polymer gasoline. These units have been both the reactor and chamber type units and in many cases, an old Cross reaction chamber has been converted to serve as a poly reactor.

Due to the falling off in demand for heavy residual fuel oil, there has been considerable interest in the past year in coking operations. Several large units of the delayed coking type have been installed in the past year. This operation consists essentially of once-through chamber type coking of heavy reduced crude to produce some gasoline and a wide cut of coker gas oil for subsequent charge to catalytic cracking. All recent coking units have included hydraulic decoking equipment in which the coke is cut out of the chamber with a high pressure jet of water and transported from the unit to storage by the water stream.

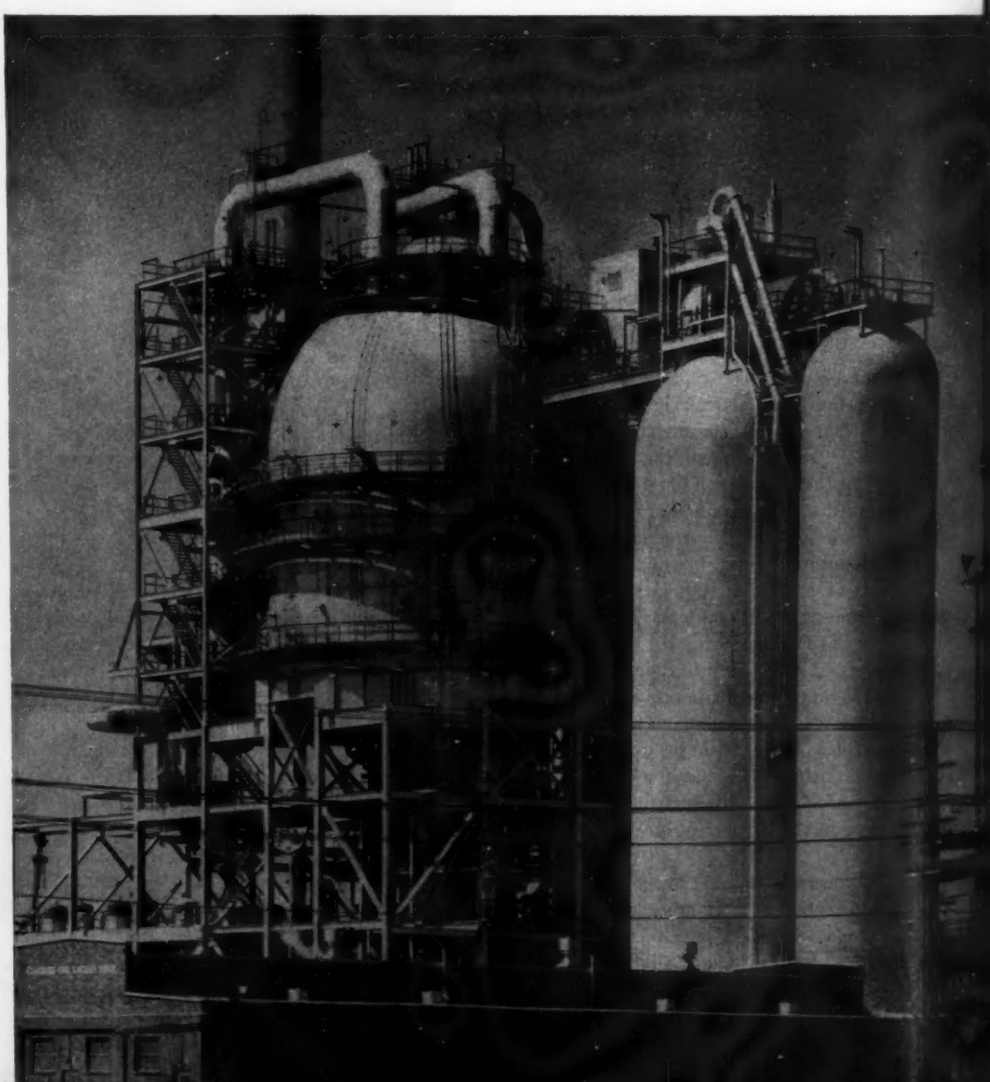
Although no commercial units are yet in operation, a continuous contact coking process is now available. In this process the charge stock is preheated and contacted on relatively large quantities of hot circulating coke particles to give a coke product consisting of dense rounded lumps about three quarters of an inch in diameter having mechanical strength and low volatile matter content. This process is truly continuous and the equipment is similar to that of the catalytic cracking process.

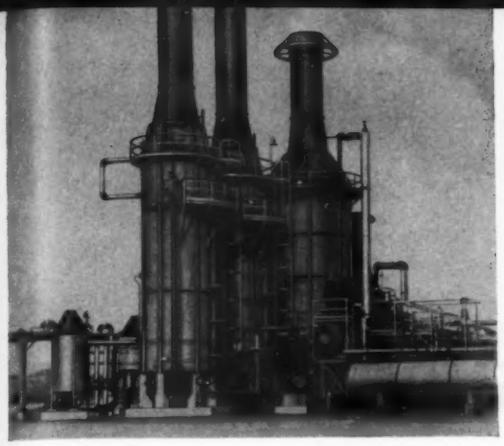
Several large lubricating oil plants have been recently completed, one the world's largest, that of the Citcon Corporation at Lake Charles, Louisiana, with a capacity to produce 6,000 barrels daily of lube oil stocks. These installations include Furfural and Duo-Sol extraction, propane deasphalting, MEK dewaxing, and contact clay filtration. The first "reversed sequence" ketone-benzol dewaxing unit was installed by The Pennzoil Company at Oil City, Pennsylvania. In this plant a finished grade wax is produced in a primary operation followed by the production of low pour point oil in a final low temperature operation which results in reducing the requirements of refrigeration and dilution solvent.

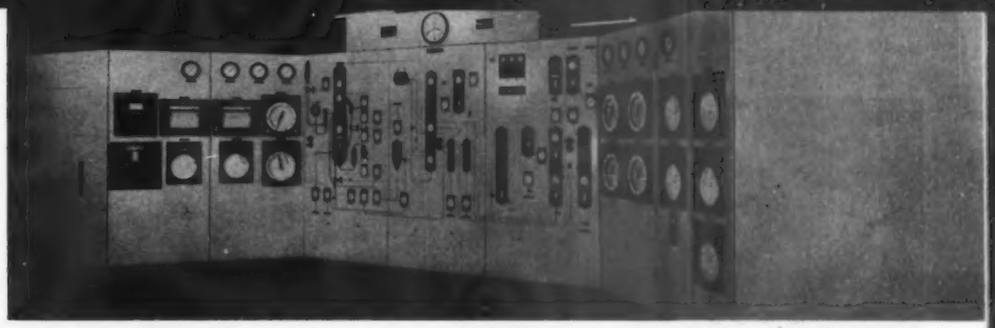
The trend toward protecting refinery processing equipment by desalting of the crude oil has continued. The electrical desalting process has been favored because of its uniformity of operation and general higher efficiency for salt removal.

Several plants for recovery of hydrogen sulfide from gas streams and subsequent conversion to elemental sulfur have been installed. One unit built by the Stanolind Oil and Gas Company at Elk Basin, Wyoming, recovers hydrogen sulfide from sour field gas by a two-stage amine absorp-

Cat crackers have been built to fit the needs of both very small and very large refineries. Pictured below is the 41,000-barrel unit recently installed by Standard Oil Co. (N. J.) at Bayway, N. J., and on opposite page the 1,500-barrel fluid unit installed by Panhandle Producing and Refining Co. at Wichita Falls, Texas. Standard photo by Corsini. Panhandle photo courtesy Universal Oil Products Co.



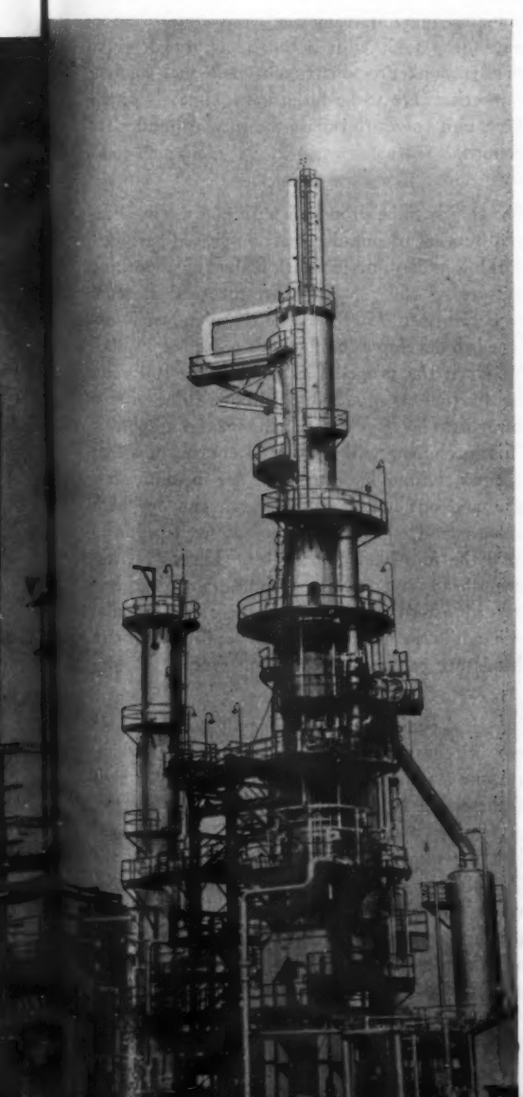




Two new type vertical steam generators installed by Southwest Oil & Refining Co., Corpus Christi, Texas. Each unit was built for 30,000 lb/hr and tested to 35,000 lb/hr overload without forced draft fan, induced draft fan, air preheater or economizer. Photo courtesy Petro-Chem Development Co., Inc. ←

New type visual control panel set up for testing before installation by Globe Refining Co. Photo courtesy Universal Oil Products Co.

tion process for improved heat economy. The hydrogen sulfide is subsequently converted to elemental sulfur by a modified Claus process unit in which a portion of the hydrogen sulfide is burned to produce sulfur dioxide, the combustion products being combined and passed over bauxite catalyst. The installation of this unit eliminated flaring of unusable sour gas and produced a valuable byproduct sulfur. An installation by the Hancock Chemical Company in the Los Angeles, California area, consists of a central amine stripping and sulfur recovery plant with individual amine absorption units at each of several refineries. Fresh amine solution is pumped to each refinery where the gas is treated and the sour amine solution returned to the central plant. This installation prevents release of sulfur dioxide into the atmosphere when the gases are burned in the refinery heaters, protects the refinery gas system and gas consuming equipment from corrosion and produces sulfur for sale to chemical companies.



In spite of a decline in price received for LPG and natural gasoline, many gasoline plants have been completed in the past year. This trend continues because of the increasing severity of regulations in Texas regarding the flaring of gas and the improvements in operations that have resulted in lowering the cost of producing LPG and distillate. Recently designed plants have placed less emphasis on high propane recovery, although in several instances, major equipment has been sized for conversion to high propane recovery should it become more profitable.

Recent developments include increasing use of radiator fan-type coolers and closed systems for jacket water on compressors and engines to minimize cooling water requirements, direct fired heaters for reboilers to eliminate steam and give a dry plant operation, recovery of power from high pressure rich oil streams by use of hydraulic, "Power Changers," and use of a bi-pressure level rich oil still for complete stripping of gasoline from lean oil at the still bottoms without using steam or gas for stripping.

One plant which is rather unique has been installed by the Warren Petroleum Corporation and associated companies near Maysville, Oklahoma. This plant, described as the world's largest gasoline plant, consists of three separate compression and absorption units and a single central distillation and fractionation plant. Lean absorption oil is pumped by large 500 HP 8-stage centrifugal pumps, to two "slave" units, each about 7½ miles from the central plant, the third absorption unit being located at the central plant, and rich absorption oil is returned to the central plant for distillation and fractionation.

Considerable interest has developed in a new method of gas absorption and separation known as Hypersorption. This process utilizes a moving bed of activated carbon to absorb hydrocarbons from refinery or natural gas with subsequent release of the various absorbed hydrocarbon fractions in a rectifying section. The process has great selectivity for absorption and retention of large quantities of hydrocarbons at low pressure. This process is of particular interest where it is desired to obtain high recoveries of high purity C_2 or C_3 fractions.

The developments in the various items of equipment incorporated in petroleum processing units are too numerous to cover adequately in this article. To mention a few, there has been an increasing trend toward the use of automatic controls to improve uniformity of operations and reduce manpower requirements. One outstanding development is the centralized control system at the Rock Island Refining Corporation refinery at Rock Island, Indiana. The entire refinery operation including desalting, crude fractionation, catalytic cracking, gas recovery and polymerization can be followed and controlled from a single 25 foot central visual control panel. This is accomplished by the use of locally mounted controllers with pneumatic resets and mercuryless transmitters. Five pneumatic recorders with four pens each are provided on the panel to provide continuous records of the more important controllers out of a total of 76 controllers and 30 indicators. The recorders are provided with snap couplings which can be plugged into any controller or indicator on the board.

The use of the improved "Kaskade" tray in place of the conventional bubble tray has increased in the past year. This type tray not only has greater capacity for gas and liquid contacting but also provides an efficient means of liquid to liquid contacting.

The use of cylindrical vertical tube heaters for a wide variety of services has increased markedly primarily because of their simplicity and flexibility. The application of the cylindrical furnace to a steam boiler is a recent and interesting innovation. This design includes a vertical steam drum with baffling which gives a rotary motion within the drum to give a hollow cylinder of water in the vertical plane as a stream liberating surface.

One trend not yet mentioned is that toward making refineries more attractive and comfortable for the operators as illustrated by the air conditioned picture-window control room complete with geraniums which has been installed with the new catalytic cracking unit by the Cosden Petroleum Corporation at Big Spring, Texas.

In summary, the past year has seen many interesting developments in petroleum processing equipment. These developments have been directed primarily toward improving product quality and product distribution as well as improving operating efficiency.

Stern post of the Velutina with propeller boss which has an internal diameter of 36 inches and external diameter of 52¼ inches.

FIRST BRITISH SUPERTANKER

FIRST supertanker to be built in the United Kingdom was launched April 4 at the Wallsend yards of Swan Hunter and Wigham Richardson Ltd. for the Shell companies. The 28,000-ton vessel was christened "Velutina" by H.R.H. Princess Margaret. She is to be delivered at the end of July.

Flame cleaning the Velutina to remove mill scale and rust before painting. Silver Primocon under water bare plate primer was used on the bottom followed by International Paints' Antifouling. Brown Primocon above water bare plate primer was used on the topsides and boottop followed by Black Danboline Topsides and Red Oil Boottop.

The "Velutina" is 643 feet long, 80½ feet in beam and 45 feet deep. She will be powered by geared turbines operating through a single screw, and a high rate of discharge will permit a rapid turnaround at port. Her principal role will be to carry crude oil from the Middle East to Shell's new refineries now under construction at Shell Haven and Stanlow, and, with an average speed of 16 knots and cargo capacity of 26,000 tons, she will be able to make about eight round trips a year from the Persian Gulf, bringing an annual total of 200,000 tons of crude to Britain. As a navigational aid the vessel is to be fitted with radar.

"Velutina" is 90-percent welded and one of the most highly welded ships ever to be constructed in the United Kingdom. An interesting feature is that, before painting, the vessel was flame cleaned—a method of preparing iron and steel surfaces for painting by intimately "scrubbing" the entire surface with high-velocity, high-temperature oxy-acetylene flames.

In accordance with tradition in the Anglo-Saxon Petroleum Co. fleet for which the "Velutina" is being built, the vessel was named after a sea shell. Velutina is one of the smaller genera of sea shells found on the shores of North America, Europe and Greenland.

The "Velutina" has a combined transverse and longitudinal system of framing, with a raked stem and cruiser stern. By means of two longitudinal and seventeen transverse bulkheads, the hull is divided in the following manner: forepeak and forehold with a deep tank, cofferdam, 11 sets of cargo tanks with a pump room between No. 3 and 4 tanks and No. 7 and 8 tanks, the after cofferdam, cross bunkers, wing bunkers and machinery space, with double bottom and afterpeak. The ship has been designed for a speed of 16 knots in normal fine weather loaded or ballasted to Lloyds summer freeboard draft.

The cargo tank capacity is approximately 26,000 tons at 50 cubic feet per ton allowing two percent for expansion.

Each pump room will be fitted with two Duplex steam cargo pumps and will be suitable for desuper-heated steam. The diameter of the cast iron cargo pipelines will be 12 inches, and the tank valves will be controlled from the deck by means of extended spindles.

The deck and tank pipelines are to be fitted in cast-iron pipe chairs with bolted straps, and the deck fuel lines will be arranged with a six-inch steel pipeline extending from aft to the forward deep tank with a four-inch branch valve to each bunker compartment. All fuel loading connections are to be fitted approximately amidships with valves to isolate the forward and after sections.

The ship is to be propelled with one screw, actuated by a set of impulse reaction-geared turbines, working in conjunction with boilers of a working pressure of 500 psi gauge pressure and a steam temperature of 750° F. The complete set is designed to develop a total service power of 11,000-shp when the propeller is rotating at 100 rpm, the maximum shp being 13,000. The astern power is to be 70 percent of the maximum power. This machinery will consist of one set of steam turbines and one high pressure, one medium pressure, and one low pressure ahead, and one high pressure and one low pressure astern turbine to drive the four-bladed propeller. The high pressure ahead and astern turbines and the low pressure astern turbines are to be of the impulse type, while the medium pressure and low pressure aheads are to be of the reaction type.

Electrical equipment to be installed will include two bth geared turbo-generators, one working and one standby, of 400 kw, 220 volts dc; each of these will have it own condenser, air ejector, lubricating pump and cooler. They will deal with the total electric current required for the 220-volt motor-driven auxiliaries, the motor generators which will supply power for electric light, steering gear motors and for the electrical equipment in the galley. The two motor-driven generators of about 45 kw capacity each will deliver

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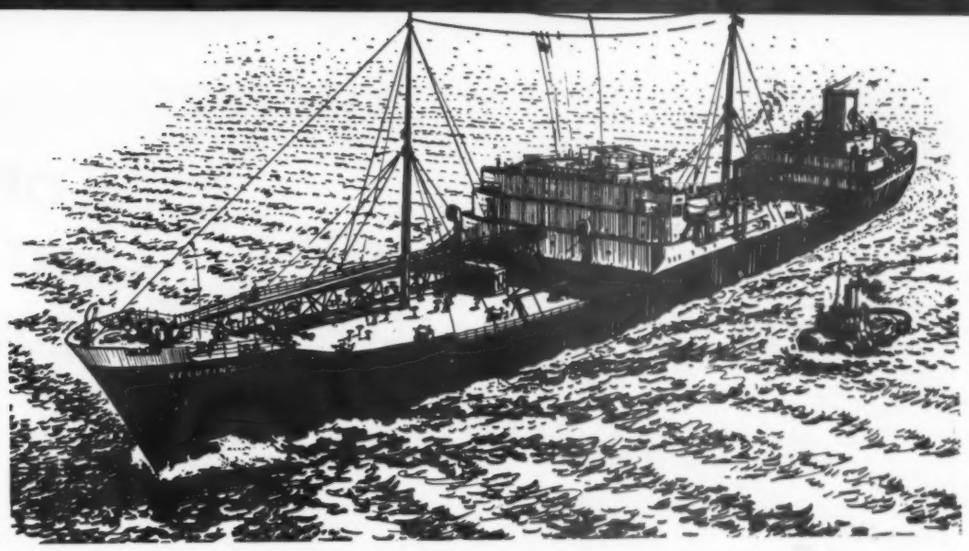


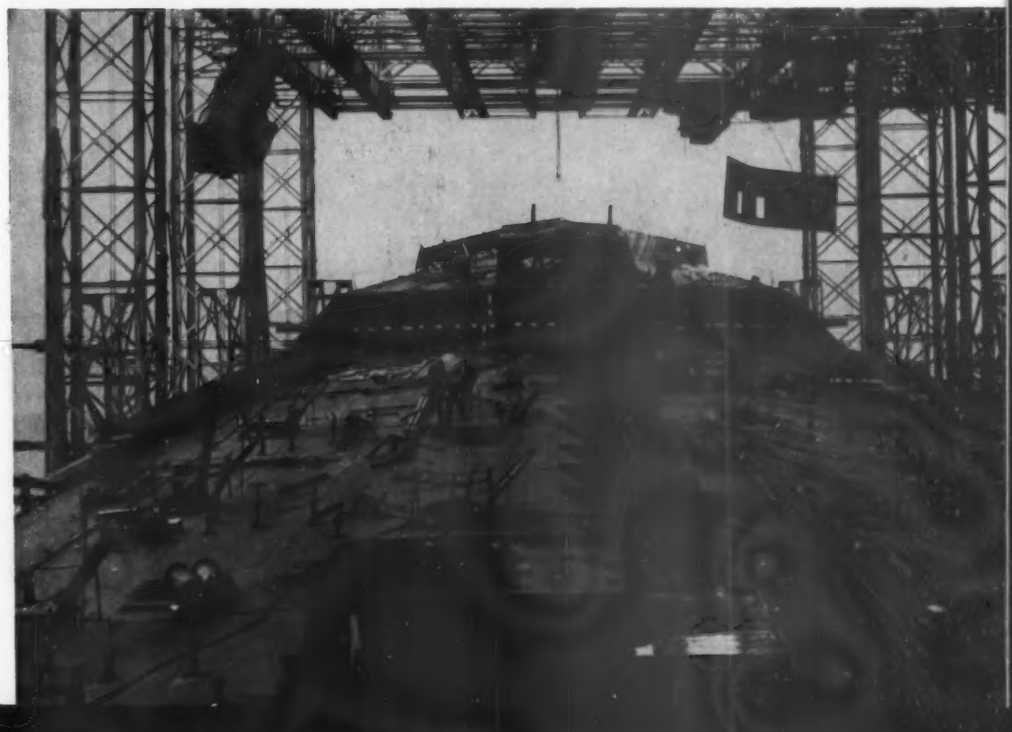
Sketch of Shell's new supertanker by John Worsley, well-known marine artist.

110-volt current for ship's lighting, thermo tank motors, gyro compass, echo sounder and radar equipment. There will also be a diesel-driven 135 kv, 220-volt dc generator which will be capable of supplying electric current for the motor generators, electric galley equipment, refrigerator and other small motors; it will be used for these purposes when the boilers and main turbine generators are not in use. The diesel engine is to be entirely self-contained and fitted with a lube oil cooler, heat exchanger and fresh and salt water circulating pumps.

The three boilers are to be of the single pass marine type, constructed for a working pressure of 500 psig, with an aggregate heating surface of not less than 19,284 square feet. Each boiler will be fitted with superheaters of requisite surface and capable of raising the steam temperature to 750° F. A de-superheater will be fitted at the superheater outlet of each of the two forward boilers and will be directly connected to the boiler drum; each will be capable of de-superheating 400,000 pounds of steam per hour from 750° F to 50° F above saturation. The oil fuel installation will be capable of burning C grade oil. The Duplex pumping and heating plant is to include two electrically driven oil fuel pumps and two oil fuel heaters. The former will be capable of maintaining a fuel oil temperature of at least 300° F when the machinery is running at full service power. The water tube boilers are to work under forced draft on the open stokehold system. The complete feed requirements of the boilers—i.e. 150,000-190,000 pounds per hour—will be met by two Weir steam turbine-driven three-stage boiler feed pumps, each capable of dealing with the whole of the feed when supplied with superheated steam at main boiler working pressure.

The Velutina is the first of four new 28,000-ton tankers under construction for Shell to be launched. Second will be in June, another in July this year, and the fourth in September 1951. Delivery of the first vessel is scheduled for the end of July with the others to be in October and November 1950 and December 1951.

Reaming coupling bolt holes on the intermediate propeller shaft during construction.



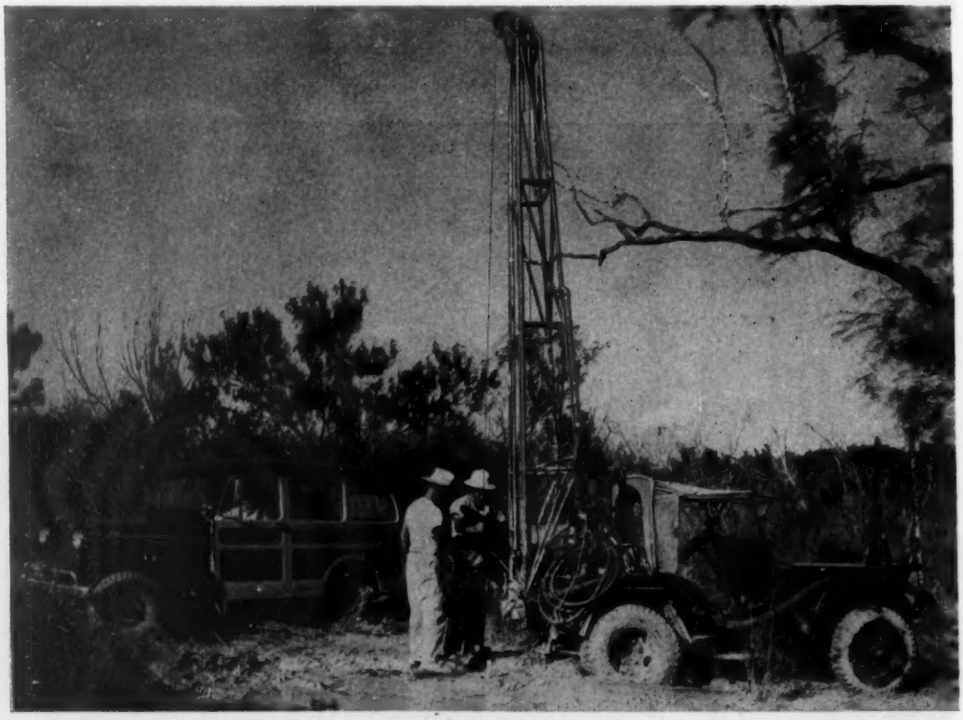
Forward well deck during construction. All photos courtesy Shell Photographic Unit, London.

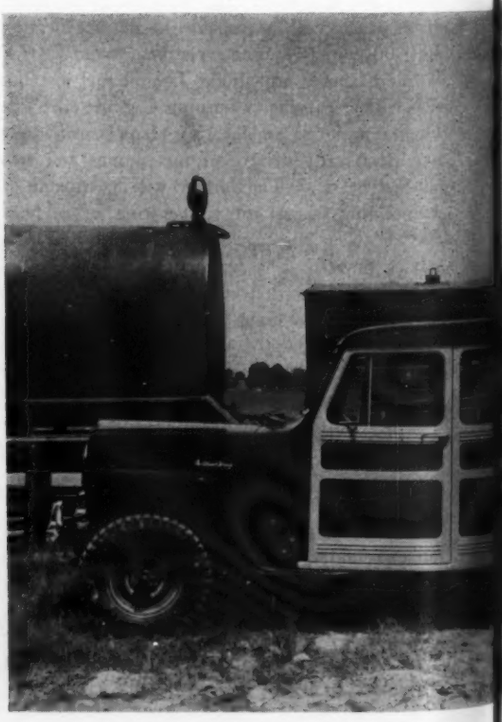
AUTOMOTIVE INDUSTRY DEVELOPS SPECIALIZED EQUIPMENT TO HANDLE OIL INDUSTRY NEEDS

Geophysical party in Louisiana swamp country. Photo courtesy Chrysler Corp.

OIL FIELDS are never found alongside concrete highways. At least hardly ever. Result is that the petroleum industry traditionally has assigned tough jobs to the motor truck manufacturer. And it seems to get worse each year as equipment gets heavier and more complex. In the desert country of the Middle East the motor truck manufacturer can approach the problem by making his trucks wider, longer and heavier. Gargantuan units have been produced for moving

Shothole drill mounted on four-wheel-drive Willys Jeep for geophysical prospecting in rough terrain.





large, unwieldy loads over difficult terrain. Off-highway units of almost any special design can be and are produced for the petroleum industry by motor truck manufacturers.

Here in the United States where some of the movement must be on public highways, the problem becomes more complex, so the ingenuity of the automotive engineer has been severely taxed in the postwar years of intensive development. He has had to watch overall widths and lengths of vehicle and limitations on axle loading, keeping in mind the diverse regulations of many different states. Weight distribution on multiple-axle units has been a matter of intense study in the distributing branch of the industry as well as in the producing fields.

International tractor-trailer unit for hauling pipe.

New trucks offered the industry for severe conditions are characterized by more powerful, large-displacement motors capable of producing proper torque, gear ratios for both fast highway transport and for powerful pulling in soft areas. The trucks have high ground clearance for off-highway work and are equipped with large diameter, large section, low pressure tires for soft or slippery going.

With powerful tractors equipped with large single tires combined with either semi or pole trailers with four large, single tires, it is possible to haul 20 to 25-ton payloads and gross train weights of 70,000 to 80,000 pounds with axle-weight limitations of 18,000 to 20,000 pounds. Powerful six-wheel trucks developed for high-speed freight service have been adapted successfully to oil field services such as cementing and exploration. In specialized operations such as those in Saudi Arabia operators are using hauling units which can handle loads up to 100 tons. Some of the truck-trailer units have as many as 42 wheels on which big, low-pressure tires are mounted.

In the distributing division tank truck design has been improved through collaboration of truck manufacturer, body builder and oil company engineers. They started with the conventional truck unit which handled a tank of 2,800-gallon capacity within legal limitations and calculated what savings in overall length should be made with new weight distribution on a specially designed chassis. They came up with a tank truck with a capacity of 3,800 gallons and with a savings in over-all length of 2½ feet.

The new unit improved the location of tank equipment to save time on deliveries. Hose and reel for deliveries were placed on the side where they are safer to use and where they escape back-end smash-ups. The new design reduced the back-end overhang from the rear wheels by three feet, thus helping maneuverability of the vehicle in pulling away from the curb and in turning.

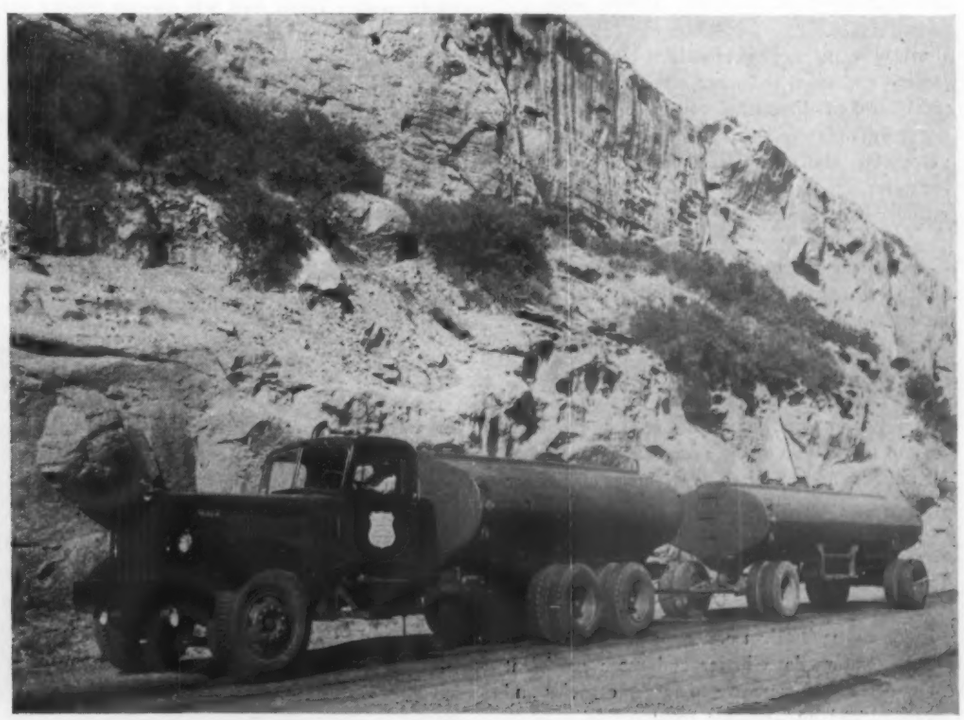
In recognition of the economic advantages of increased performance ability, whereby maximum loads may be moved more expeditiously, the post-war trend has been toward higher power-to-weight ratios. Power increase has been effected in two ways—by increasing the piston displacement of engines and by improving the specific output, that is, the power developed per cubic inch of displacement.

Surprising to some has been the fact that in many cases the use of more powerful engines in chassis of given capacity has not resulted in greater fuel consumption. On the contrary, greater fuel economy has accompanied increased power in many instances. This is accounted for by the fact that with more powerful engines there has been less running in the lower gears, total gear reductions have been made lower numerically in most cases, and the engines power factor has been improved.

Increased specific output has been implemented to a considerable degree by the general raising

Geologist examines cuttings from wildcat well with equipment carried in station wagon.

300-hp six-wheel Mack truck and four-wheel pole trailer designed for long distance transportation of oil products.



of octane numbers of regular grades of gasoline, thus permitting corresponding increases in compression pressures and consequent gain in both power and economy.

But the gains have gone beyond merely increased compression ratios. As a matter of fact the rise in actual compression pressure has been somewhat greater than the increase in compression ratio, accomplished by improvement of volumetric efficiency. Development of intake manifolds to reduce restriction, improvement in valve porting, slightly larger intake valves and alterations in valve timing and cam design have been effective in raising volumetric efficiency. Governed speeds have been raised slightly over prewar practice, and continuation of developments in combustion chamber form and spark plug location have also contributed to improved specific output.

Along with these fundamental improvements, the truck engine has also undergone development in other respects. To withstand the higher combustion temperatures implicit in higher brake mean effective pressures, the use of sodium-filled exhaust valves has become more general, and these valves have been much improved in dependability while reduced materially in cost. Also the hard-facing of valves has become more general, so that longer life of both valves and seats is assured. There has been considerable progress in the adoption of valve rotators to contribute to this.

Meeting the severer exactions on piston rings which the higher BMEP has made, much study has been given the matter of piston rings. The deep-slot, narrow-faced compression ring and the flexible oil control ring, as well as the stepped scraper ring have been successfully incorporated in the newer engines, and the general practice has been to locate the top ring lower on the piston to protect it from the maximum flame. Chrome plating of rings has served to increase their durability and to lessen cylinder wear.

Postwar engines generally have longer water jackets, and more and more makers are adopting some form of directional control of circulation, not only to avoid critical temperatures at the valves, but also to maintain more uniform temperatures throughout the block, thus reducing cylinder bore distortion.

Case-hardened and counterbalanced crankshafts, which before the war were found in only a few makes, are becoming increasingly popular since. More attention is being paid to the niceties of balance, particularly with respect to connecting rods and in the use of torsional vibration dampers of several sorts. There has been much attention to the matter of cylinder head gaskets, and air cleaners and oil filters of greater capacity are coming into more general use.

Accessories have not lagged behind the engines themselves in the general refinement of design and increase in capacity. Generators today are of larger capacity than prewar, and modern voltage regulators do a better and more consistent job. Air compressors are of larger capacity and more rugged and reliable construction.

Newly designed tank truck with increased payload and shorter overall length. Photo courtesy The White Motor Co.

Narrowing profit margins have made truck operators increasingly concerned with fuel costs. This has led to greatly increased interest in the diesel engine with its potentialities for cutting the fuel bill approximately in half. From their prewar position of utilization principally on long-haul freighting runs, the field has broadened to a point of domination in the mass transit bus and off-highway mining and quarrying operations and rapidly expanding popularity in all forms of over-the-road hauling.

Although current interest seems to be chiefly in diesels of large power output, including supercharged models, there is a growing demand for more moderate sizes, and buyers are becoming increasingly critical of roughness, smoking and odor. Both mechanically and thermodynamically, automotive diesels have been refined and developed to achieve improved power and economy and enhanced reliability and ease of maintenance. In the hydraulically-actuating governor and the fuel-burning manifold heater for cold-weather starting are postwar developments which have materially improved the behavior and adaptability of diesel power to trucks.

Although ample horsepower is the prime requisite for performance, nevertheless, proper and effective application of the power is essential to realization of potentialities. In recognition of this the postwar period has witnessed consistent development of transmissions and drives. Although considerable tentative and experimental work has been carried out on various applications of hydrokinetics to transmissions, such as the use of fluid

300-hp gasoline engine truck with separate auxiliary engine for oil well cementing. Photo courtesy Mack-International Motor Truck Corp.

couplings and hydraulic torque converters, the stepped, positive gear transmission is still the basic ratio-changing device. Although some use has been made of synchro-mesh principle, its limitations have prevented widespread application. Nevertheless, progress has been made in the facilitation of gear-shifting and the quieting of gearboxes by the widespread adoption of the constant-mesh, individual-clutch type of transmission.

To permit the engine to operate at its best under all variations of operating conditions, multi-speed arrangements have been adopted widely, whereby the total spread of ratios has been broadened, while the intervals have been brought closer together. Means of accomplishing this result are varied. Two-speed axles, separate auxiliary transmissions and all-in-one Duplex transmissions have all undergone greater popularization and have proved capable of enhancing both the work potential and economy of vehicles. Power shifting and single-lever control of such arrangements have been adopted extensively to permit greater ease, certainty and speed of control.

The motor truck industry has engineered its post-war units to fit the truck to the job to be accomplished. And since the oil industry has such varied requirements, many truck companies have expanded their lines to permit of great latitude in selection. One company, for example, has 87 basic motor truck models available for different jobs ranging all the way from light pickups to giant haulers of heavy drilling equipment equipped with 300-hp motors.

Right—Walter tractor-truck designed with very large tires and high clearance for moving heavy loads under adverse road and off-highway conditions.

Chevrolet truck with 161-inch wheelbase and 16,000 pounds gross vehicle weight equipped with semi-trailer for oil field hauling. →

Fourteen International trucks mounted with oil field drilling and servicing equipment ready for export to Europe. The nine larger drilling units are mounted on diesel powered trucks.

TANKER BUILDING MATCHES INDUSTRY GROWTH

After several busy years the world's shipyards still had orders on hand for 320 tankers at beginning of 1950. British and Swedish yards are most active.

The Texas Company's 28,000-ton supertanker Pennsylvania. Photo courtesy Bethlehem Steel Co.

TANKER construction continued active in the world's shipyards during 1949. At the beginning of the year 391 vessels were under construction or on order. Shipbuilders completed 119 tankers during the year but still had a backlog of 320 orders on which they were working on Jan. 1, 1950. Three countries account for 83 percent of the total ships under construction and on order, with the largest constructor nation being Great Britain, having 41.6 percent as compared with the United States, which is second with 22.1 percent, and Sweden being third with 19.4 percent of the total new construction. Three nations also will receive nearly 77 percent of the new tankers when completed, namely: Norway, 33.6; United States, 23.5, and the United Kingdom, 19.5 percent.

The following table shows details by countries as reported by the Shipbuilders Council of America:

WORLD TANKER CONSTRUCTION
In Hand or On Order—January 1950
(1,000 Gross Tons and Over)

Where Building	No.	Gross Tons
Belgium	5	55,148
Canada	3	23,466
Denmark	7	82,750
France	8	111,321
Great Britain	161	1,740,745
Holland	17	190,002
Italy	1	17,333
Japan	3	37,200
Norway	6	45,334
Spain	4	32,617
Sweden	77	817,341
United States	28	502,700
Total	320	3,755,958

Lloyds Register of Shipping reports that British yards completed 48 tankers with a gross tonnage of 434,230 in 1949, out of a total for the world of 119 with a gross tonnage of 1,335,528. The United States was first in gross tonnage with 598,233 but second in vessels completed with 36. Sweden completed 22 tankers with an aggregate gross tonnage of 183,934. Completions in other countries were: Belgium and Holland, three each; Denmark, two, and one each in France, Italy, Japan, Norway and Spain. Lloyds lists only ships of 1,000 gross tons and over.

The rapid completion of new tankers plus the more moderate rate of increase in oil consumption had an adverse effect on tanker charter rates in 1949. As shown in the accompanying table, average single-voyage fixture rates for clean ships dropped to $2.21 per ton in 1949. This was equal to 77.5 percent of the U.S.M.C. base rate of $2.85 per ton. Dirty ships were fixed at an average of $2.01 per ton, 70.5 percent of base.

From the West Indies to the United Kingdom rates averaged about $4.50 per ton or 68.5 percent of base. The average from Persian Gulf ports to the United States north of Hatteras was about $8.35 per ton, which was 66 percent of the base. An accompanying chart reflects the trend of rates for the past two years.

SUMMARY 1948-1949 FIXTURES
Average Rates for 1949-1948 Base on Single Voyage Charters U. S. Gulf to U. S. N. H.

	1949		1948	
Month	Clean	Dirty	Clean	Dirty
January	$2.75	$2.43	$5.70	$7.12
February	2.57	2.33	8.55	7.96
March	2.22	2.04	4.33	4.33
April	2.07	1.94	4.27	4.27
May	1.71	1.69	3.36	3.84
June	. . .	1.35	. . .	2.78
July	1.28	1.28	2.28	2.24
August	1.36	1.33	. . .	2.27
September	1.81	1.58	2.14	2.19
October	1.99	1.88	2.48	2.49
November	2.22	2.10	3.19	2.93
December	2.66	2.37	2.80	2.66
AVERAGE	$2.21	$2.01	$3.95	$3.31

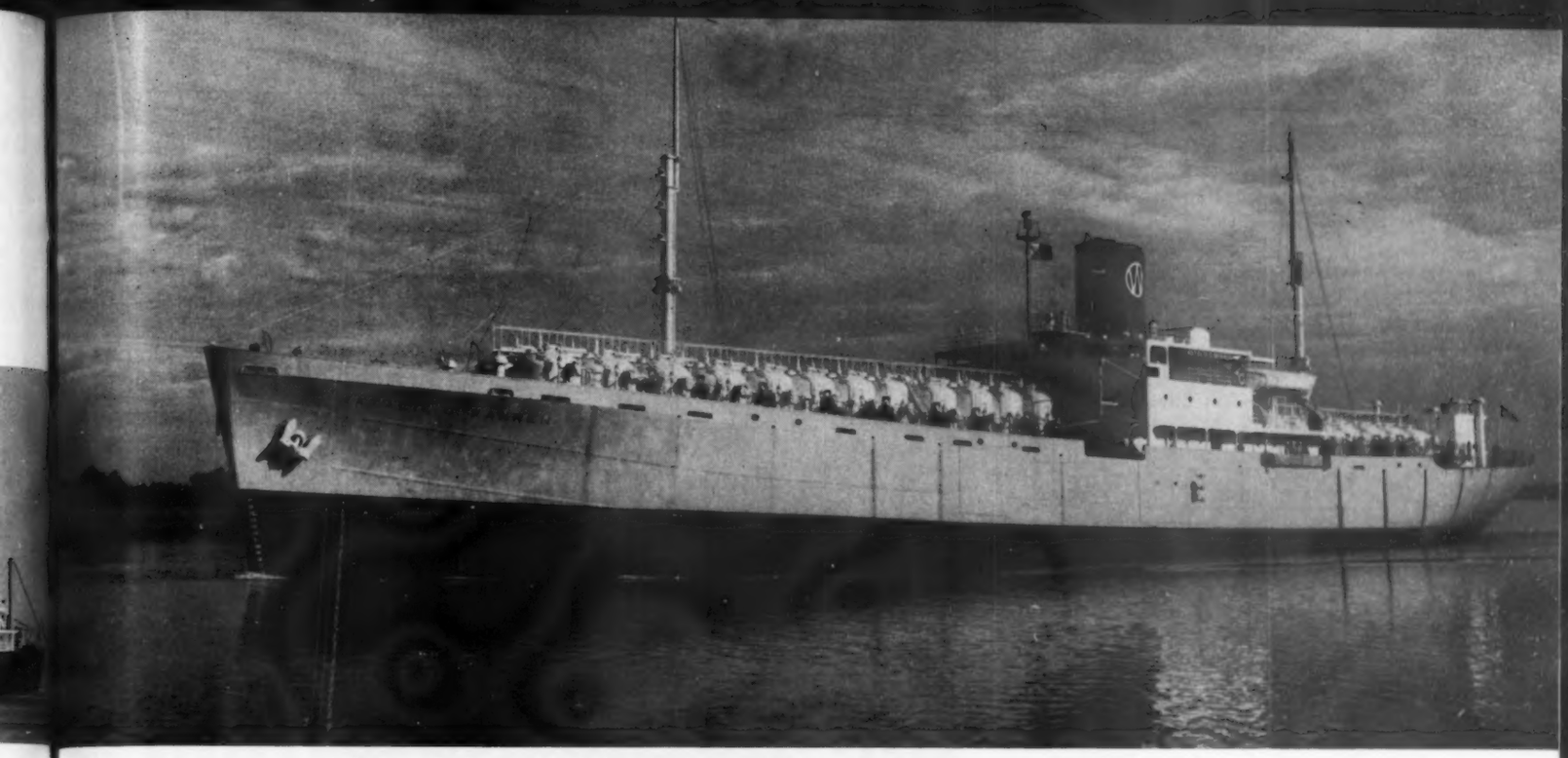
Table prepared by Deitze, Inc., oil and ship brokers and ship chartering agents, New York, N. Y.

Analysis of the world's fleet reveals that vessels are continuing their long-term trend of increased speed and increased capacity. A study by Benedict Saurino of Sun Oil Co. shows the average vessel today to have a deadweight tonnage of 12,753 and a speed of 13.18 knots. Ten years ago the tonnage average was 10,566 and the speed 11.07 knots. Reflecting both size and speed, the average tanker today has 44 percent greater capacity than ten years ago at the outset of World War II. In the first decade of this century tanker capacities increased 25.8 percent. In the second decade, which included the period of World War I, the increase was 42 percent. In the third decade the average capacity was enlarged by 19.5 percent, and in the ten years before World War II the increase was 24 percent.

In his recent study of the world's tanker fleet Mr. Saurino has concluded that current building is about in line with the industry's normal growth and provides for replacement of scrapped vessels. He suggests that the world fleet will be in balance with demand at the end of 1953 when the Trans-Arabian Pipe Line is completed and able to deliver 500,000 barrels of Persian Gulf oil daily to the Mediterranean.

Mr. Saurino has made a study of the useful life probability of tankers, in which he found that the average age of the 281 tankers scrapped between 1922 and 1949 was 26 years, five months. The current world fleet has an average age of nine years. There are six ships still in service which are more than 50 years old.

In past years the rate of scrappage has fluctuated widely. Large concentrations of scrappage were experienced during the depression period 1931 through 1936 as an aftermath of World War I construction, and also postwar in 1946 and 1947, reflecting the deferment of normal scrap-



The converted cargo carrier Natalie O. Warren utilized by Warren Petroleum Corp. as an ocean-going propane carrier.

ping due to the urgent World War II needs for tanker tonnage. For the period covering the six earlier years approximately 5.6 percent of the world tanker capacity was scrapped, while in the two postwar years 3.5 percent of the world fleet was scrapped on a capacity basis.

Applying the average scrappage age of 26 years, five months, established by the experience over the past 28 years and accepting estimated delivery dates for the new construction, Mr. Saurino found that by 1953 there will be a net increase equal to the tonnage now on order amounting to 6,250,000 deadweight tons, or 27.2 percent of the present world capacity, when assuming no scrappage during the next four years. On the assumption of full scrappage of 26-year-old vessels, the net increase by 1953 will be about 3,500,000 deadweight tons, or 18.5 percent over the next four years. On the basis of a 20-year life for the present vessels, the net increase by 1953 will be 10.2 percent.

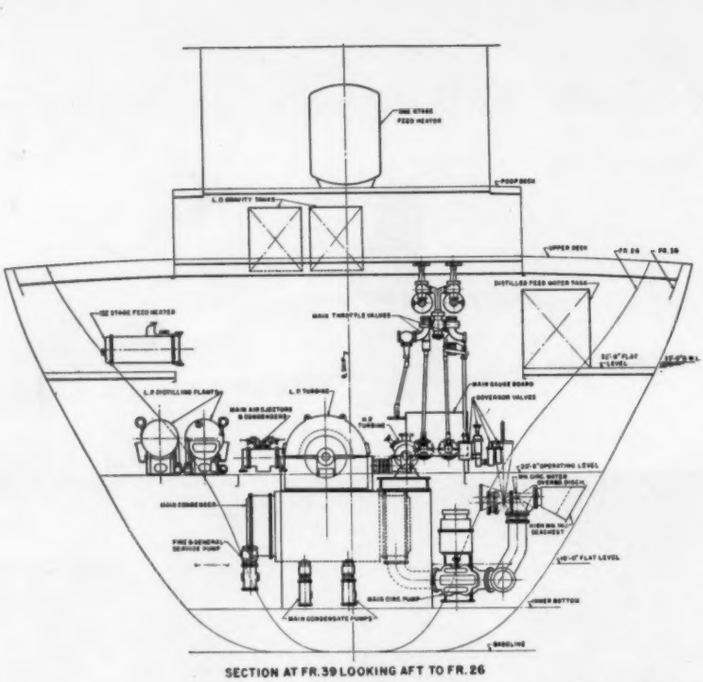
In 1940 world tanker capacity was ten and one-half times the 1914 level. On the average fleet capacity increased about 27⅓ T2 equivalents each year. This period showed a fairly constant rate of growth. On this basis and without the occurrence of World War II, a worldwide requirement equivalent to 1,200 T2's by 1954 would have been the result of a continuation of this normal growth. Applying this normal growth to the 1,352 T2 equivalents in the current fleet would indicate that by 1954 a net addition of 109 T2 equivalents would be necessary for normal growth, or a total of 1,461 T2's. When allowing for scrappage of only the 26-year-old vessels, there will occur an increase of 250 T2 equivalents over the next four years, or a computed excess of 141 T2's over these derived normal requirements. If scrappage of the 20-year-old and over vessels is assumed, an increase of 138 T2's is indicated, or an amount of 29 T2's or two percent over and above computed normal requirements.

Two additional factors should be considered, namely, the availability of tankers due to the completion of the Trans-Arabian Pipe Line and the normal lay-up of tankers for drydocking, repair and inspection which averages approximately 7.5 percent of the normally active fleet. These two factors tend to offset one another in the calculation, if it is accepted that the maximum planned capacity of the Tapline, amounting to 550,000 barrels per day, replaces approximately 104 T2's. The indications are that world fleets will be about in balance by the end of 1953.

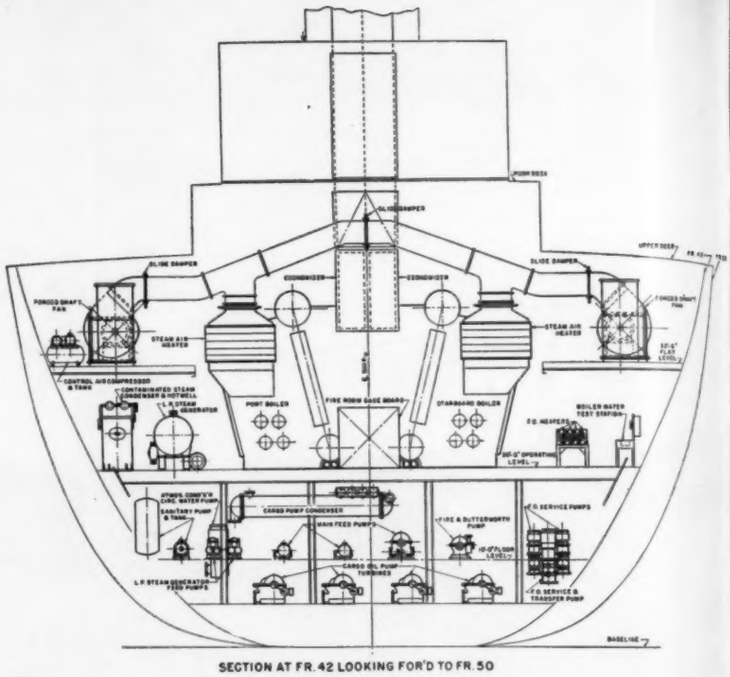
Although the U. S. Maritime Commission reserve fleet increased 223 vessels in 1949 to 2,189 on December 31, the only tankers in the reserve fleet were 13 Liberty ships and 12 small coastal vessels. The privately owned American flag tanker fleet of 443 units, totaling 6,790,801 deadweight tons, represents about 27 percent of the world tankship tonnage. About 53 percent of these vessels, or 240, are of the war-built T2-SE-A1 turbo-electric drive type. This is one of the most modern national tanker fleets in the world, averaging seven years of age, 14 knots speed and about 15,300 tons in deadweight tonnage. It has almost twice the carrying capacity of the prewar fleet of 353 units, aggregating 2,589,442 gross tons. In addition to these vessels, approximately 80 percent of the 2,650,000 deadweight tons of tankers registered in Panama are American owned. Thus, with the additional American-owned tankers under other foreign flags, more than one-third of the current world tankship tonnage of 25,000,000 deadweight tons is privately controlled in the United States. During 1949 15 of the privately owned Liberty type tankers were converted into dry cargo ships, and one T2 and a smaller tanker into acid carriers.

Of the 33 tankers of over 2,000 gross tons each completed in the United States during 1949, all except one was powered by geared steam turbines. The one vessel with reciprocating engines was a 7,330-ton special-purpose ship of only 2,400 hp. Average of the remaining 32 was 13,000 hp. Included in the shipyard production totals for 1949 are three of the 30,000 deadweight ton tankers, currently the largest of their type in existence, built by the Welding Shipyards for the National Bulk Carriers. These vessels were constructed in the remarkable time of five to six months from date of keel laying. Also completed were 26 of the new supersize tankships, of 26,500 to 28,300 deadweight tons, constructed by the Sun Shipbuilding & Dry Dock Co., Newport News Shipbuilding & Dry Dock Co., The Bethlehem Steel Company plants at Quincy, Mass., and Sparrows Point, Md. The latter yard also built two tankers of 18,100 deadweight tons and one of 16,500 tons.

Fundamental in the development of design of the supertankers built by Bethlehem as well as other shipbuilders was the requirement that the vessels be suitable for operation in both of two dissimilar trades—transportation of crude oil from Persian Gulf and South American ports to the Atlantic or Pacific coasts of the United States, and transportation of light petroleum products in the domestic trade from Gulf ports to Atlantic coast ports such as Philadelphia or New York. This limitation affected the cubic capacity of cargo space and the bunker capacity. Details of the design were given in a paper by H. de Luce and W. I. H. Budd of Bethlehem Steel Co. before a recent meeting of the New England section of

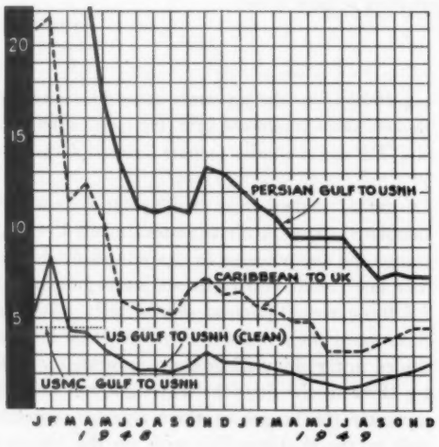


SECTION AT FR. 39 LOOKING AFT TO FR. 26



SECTION AT FR. 42 LOOKING FOR'D TO FR. 50

Cross sections through typical Bethlehem supertanker showing machinery arrangement in areas occupied by steam generators, turbines and auxiliary equipment.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15
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5
PERSIAN GULF TO USNH
CARIBBEAN TO UK
US GULF TO USNH (CLEAN)
USMC GULF TO USNH
J F M A M J J A S O N D J F M A M J J A S O N D
1948
1949

Trend of single voyage charter rates. Data courtesy Dietze, Inc., ship chartering agents, New York.

Applying grease to ways before launching tanker. Socony-Vacuum Oil Co. photo.

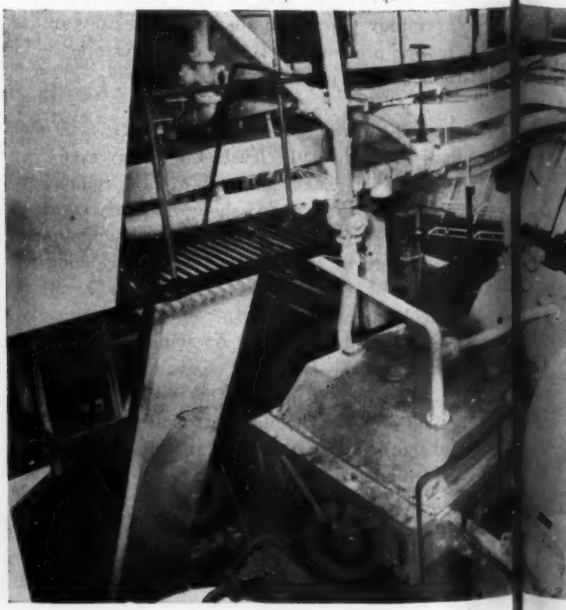
The Society of Naval Architects and Marine Engineers.

The necessity of large bunker capacity for the Persian Gulf service, and the equal importance of large cargo tank volume when in domestic service, suggested the conversion of some of the cargo space volume to bunker space when in the Persian Gulf trade. This was particularly feasible inasmuch as the relatively high density of the crude oil cargo brought in from Persia results in considerable outage. Actually the ship's permanent bunkers were selected on the basis of providing sufficient fuel for one way. The after pair of wing cargo tanks can be used as fuel bunkers if it is desired to increase the cruising radius to permit round-trip bunkering.

The capacity of the cargo tanks was chosen to permit loading the vessel to her designed draft with a cargo of gasoline when bunkered at the loading port for a typical round trip voyage between Port Arthur, Texas and Philadelphia. The fore and aft center of gravity of this cargo volume and the center of buoyancy of the underwater form were adjusted to provide satisfactory trim with this loading, the arrival condition at Philadelphia being critical.

Of prime importance in the economical operation of the modern supertanker is the ability to load and discharge cargo quickly. In the Bethlehem group of ships the main cargo pumps are driven by small, efficient, geared turbines which exhaust

Main propulsion machinery of Bethlehem supertanker consisting of one high pressure and one low pressure turbine driving a 22-foot, four-bladed propeller to develop 12,500 normal shaft horsepower.



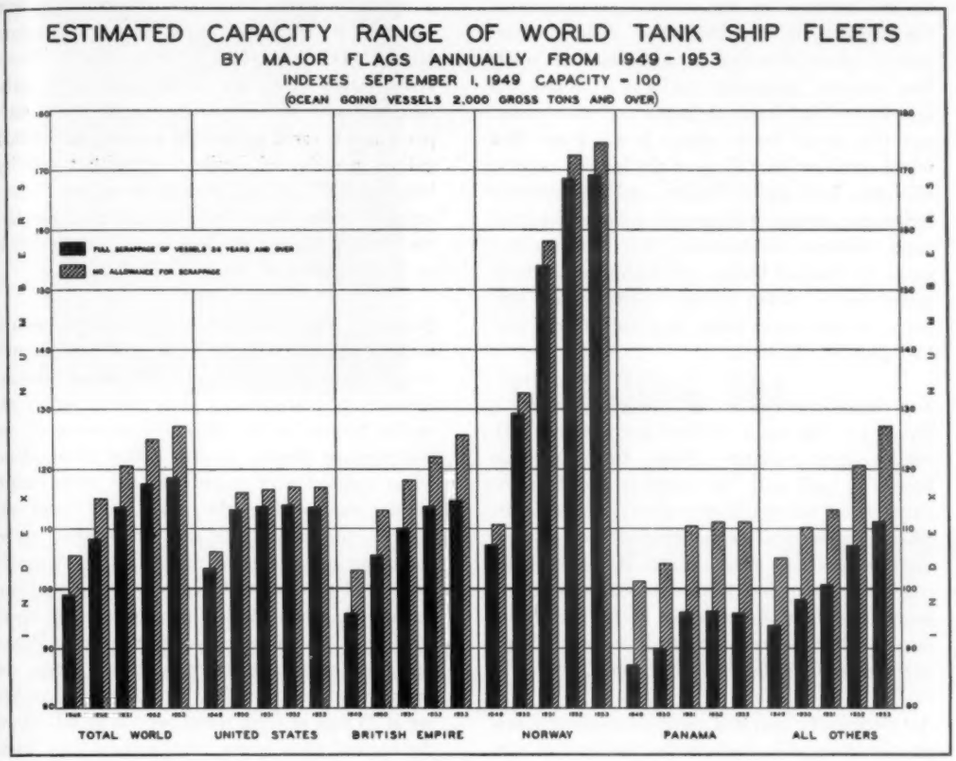


Chart courtesy statistical research division, Sun Oil Co.

at atmospheric pressure to a separate condenser. Consideration was given to the use of sub-atmospheric back-pressure, but the design and operating complications introduced by vacuum equipment did not seem justified by the efficiency gains since these units are operated for only a relatively short time.

The four main cargo pumps are horizontal, centrifugal turbine-driven units, each capable of delivering 4,100 gpm at a discharge pressure of 125 psig. Dual controls for these pumps permit operation from the deck level for convenience in loading and unloading.

The cargo pump room is located at the aft end of the main cargo tanks, just forward of the boiler room. This location permits the installation of the main cargo pump turbines in the lower level of the boiler room, while the pumps are situated in the pump room and driven by shafting which passes through suitable seals in the bulkhead. This arrangement permits the steam and exhaust piping for these pumps, together with condensers and associated systems to be confined to the machinery space.

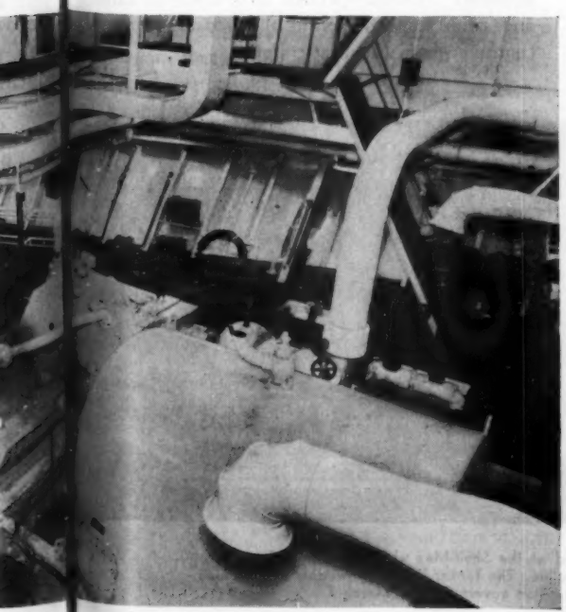
The majority of vessels are equipped with four vertical reciprocating type stripping pumps, capable of delivering 500 gpm at a discharge pressure of 125 psig. Several vessels have two turbine-driven rotary stripping pumps instead of the four vertical reciprocating type units. In addition to the normal stripping operations, these pumps may be utilized for priming the cargo pumps when necessary.

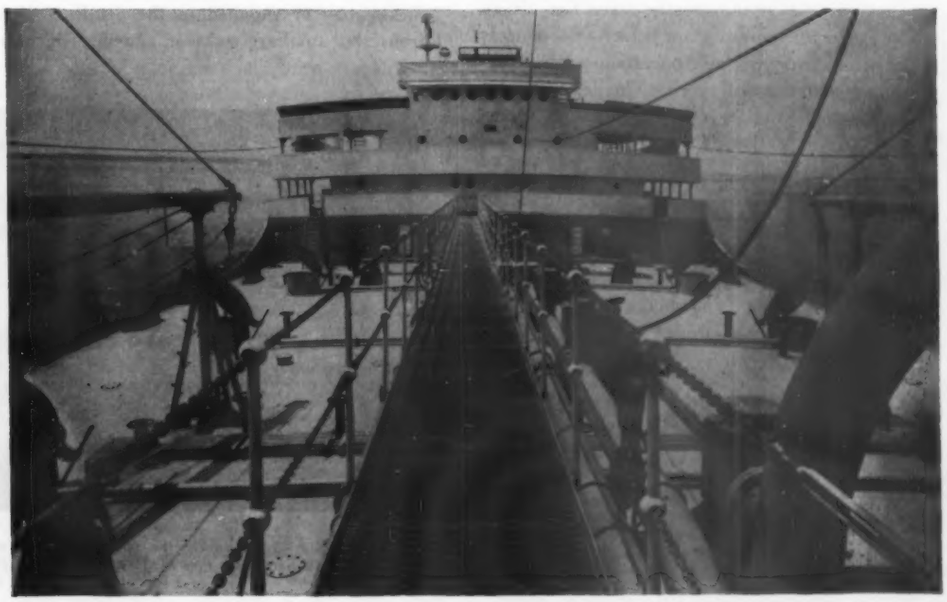
The main propulsion machinery in the Bethlehem tankers consists of one high-pressure and one low-pressure turbine of Bethlehem design and manufacture, driving a four-bladed, solid manganese bronze propeller of 22-foot diameter and approximately 27 tons' weight through double reduction gears. This unit has a normal ahead rating of 12,500 shaft horsepower at 100 rpm. Steam is produced at 600 psig and 850° F. This compares with the prewar steam conditions of 440 psig and 740° F. Land and naval practice had indicated the greater economies possible with advanced steam conditions.

The 850° F temperature was selected because it gives substantially improved results without superheat control and the metallurgical difficulties encountered above 900°F. The selection of 600 instead of 900 psig was made because of equipment availability and simplicity and because it was felt that the law of diminishing returns was beginning to operate. If higher pressures were to be adopted, it was thought that the jump should be all the way to 1,500 psig. This condition was not proposed, however. Between 440 psig-750°F and 600 psig-850°F, the reduction in fuel consumption is six percent. Only two percent more could be gained at 900 psig, but an additional six percent increase in efficiency would be achieved at 1,500 psig.

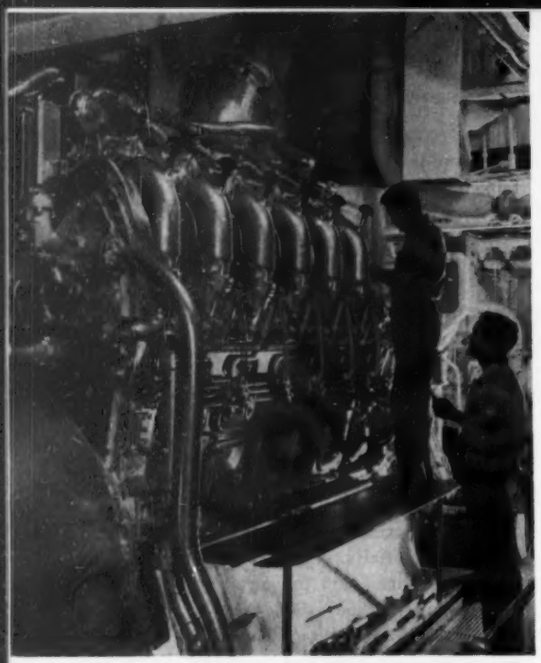
The high-pressure turbine is of the combined impulse-reaction type. The low-pressure turbine is of the single-flow reaction type, exhausting downward to a main condenser athwart ship below the turbines. Either turbine may be operated separately in case of emergency. An astern turbine, capable of providing ample torque for stopping and maneuvering the vessel, is fitted in the low pressure turbine casing.

Bethlehem supertankers are each equipped with





Deck view of Bethlehem 28,000-ton supertanker showing fore and aft gangway from bridge to forecastle.



Engine room of tug recently placed in service by Socony Vacuum Oil Co., Inc., for operations in New York harbor, the Hudson river and coastwise to Philadelphia.

two Foster Wheeler D type marine steam generators, one left hand and one right hand. A pictorial cross section accompanies this article. Each steam generator includes a two-drum bent-tube boiler section, side and rear waterwalls, convection type superheater and an all-welded extended surface economizer. A desuperheater, which supplies low-temperature steam to auxiliaries, is installed in the steam drum below the normal water level.

The boiler section consists of a steam drum and a water drum connected by an inclined bank of tubes. The two drums are also connected by watercooled side and rear furnace walls.

Each boiler is of the straight-through, single-pass design and has a heating surface of 6,710 square feet, including waterwalls, while each economizer has 4,970 square feet of heating surface. The boilers are designed for normal continuous evaporation of 47,500 pounds of steam per hour at 600 psi and 850° F at the superheater outlet, which is in excess of the maximum power requirements and is sufficient to permit operation of the tank-cleaning system at full speed. The desuperheater is capable of handling 60,000 pounds of superheated steam per hour.

In order to provide adequate water circulation in the boiler, eight three-inch OD downcomer tubes expanded into the water space of the upper steam drum connect the steam drum with the lower water drum. The downcomer tubes are enclosed in the boiler casing but are not exposed to the hot furnace gases.

The superheater is located behind the first three rows of two-inch boiler tubes and in front of the bank of 1¼-inch tubes. It consists of U-bend elements rolled into headers which are parallel to the boiler tubes. The superheater elements extend across the boiler at right angles to the boiler tubes.

In the selection of the various components of the steam cycle, the Bethlehem designers considered three alternate arrangements of waste heat recovery equipment: (a) gas air heater and economizer, (b) steam air heater and economizer, and (c) gas air heater alone. It was found that while combination (a) gave the highest relative efficiency, both gas air heaters and high-pressure feedwater heaters had several serious disadvantages, whereas combination (b), which eliminated the gas air heater and high-pressure feedwater heater, added to the reliability and simplicity of the power plant at a cost of only one-half percent efficiency.

Superheated steam, at full boiler pressure, is supplied to the main turbines and the two 400-kw generator turbines. Steam from the main boilers is used only for turbines and heat exchangers in the machinery space; all steam required for ship and tanker services such as heating of quarters, galley, fuel oil heating and auxiliaries is supplied from a low-pressure steam-generating plant of Bethlehem design and manufacture which delivers saturated steam at 120 psi at the rate of 35,000 pounds per hour.

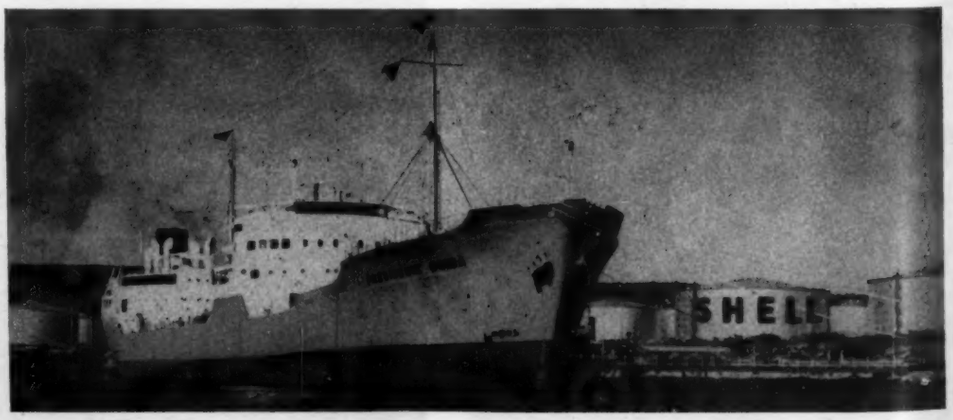
An electrically operated combustion-control system automatically regulates the fuel and air supply to the steam generators to meet the fluctuations in the steam demand. It consists of three regulators mounted on a single support stand—a steam pressure regulator, which controls the loading of the fuel-oil pressure regulating valves, and two air-volume regulators, one for each boiler, which control the air flow to the burners in response to the mechanical loading from the steam-pressure regulator. The ratio of fuel and air to each boiler is adjusted by means of a fuel-air ratio arm for each boiler, located on the sides of the air-volume regulator.

On the majority of vessels, a single fresh-water system is provided, which furnishes water of potable quality for all purposes. All fresh water is supplied by the distillation of sea water in two low-pressure single-effect horizontal submerged-tube distilling plants.

Steam may be supplied to the distilling plants from the auxiliary exhaust system, which has automatic make-up from the intermediate-turbine bleeder, or from the eight psia low-pressure bleeder. When supplied by the auxiliary exhaust system with a pressure of five psia at the tube nest and with 85° F seawater temperature, each plant has a rated clean-tube capacity of 10,000 gallons per day of fresh water with a salinity less than 0.25 grains of sea salt per gallon. When supplied with steam from the eight psig bleeder, the clean-tube capacity of each unit will be 6,000 to 7,000 gallons of fresh water per day.

Normally both plants operating on low-pressure bleeder steam will furnish the total fresh water requirements of the ship. In this way maximum economy is realized and scale formation is retarded because of the lower temperature of the low-pressure bleeder steam. Either plant alone when supplied with steam from the intermediate bleeder can produce the total fresh water required, thus permitting the other plant to be taken out of service for maintenance. Approximately 43 tons of fresh water are produced per ton of oil, when the distilling plants are operated with low-pressure bleeder steam. When furnished with intermediate-bleeder steam via the auxiliary exhaust line, the corresponding figure is 23 tons of fresh water per ton of oil. Since the normal fresh water requirements vary from 5,000 to 7,000 gallons per day, the oil required to produce this quantity amounts to about .6 to .9 percent of the total necessary to run the ship. The distilling plants are a packaged design with all necessary pumps, motors and auxiliaries mounted upon them, resulting in a compact arrangement with appreciable saving of space and piping. The shell is welded copper nickel with tubes and tube sheets also of copper nickel. Adjustable weir type level controllers are provided for maintaining constant water levels. Each plant is provided with its own salinity indicating equipment and a solenoid operated valve in the distiller condensate pump discharge arranged to divert the output to bilge whenever the salinity exceeds 0.25 grains of sea salt per gallon.

The inherent stability of these distilling plants together with the weir type level controllers, the automatic solenoid operated flow diversion valve and salinity system permit them to be operated continuously without attention.



Brazil's first tanker the Presidente Dutra moored at the Shell-Mex wharf at Rio de Janeiro to discharge her first cargo of 15,000 tons of gasoline. The tanker is the ex-Swedish Venus which was formally delivered to the Brazilian government on March 7.

Laurence E. Ferguson, field sales manager, The Wheland Co., Tulsa, Okla.

TRENDS IN

OIL FIELD EQUIPMENT

By Laurence E. Ferguson*

IN EVERY phase of the petroleum industry there is evidence of the technological gains which are in part the fruits of prodigal effort under wartime impetus and postwar planning, now translated and applied to the industry's tools and practices. The guiding star of these endeavors has been the consciousness that "there must be a better way." The ultimates are not just around the corner, although the engineers, the technicians, the practical "hands," designers, suppliers and the users seem to go on about their individual tasks with as much energy as if they were about to achieve perfection. Comment may be added, in justice, that this is a healthy industry which enjoys relatively free enterprise, a minimum of statism in control and the force of energetic and imaginative competition—and that so long as the independent (wildcatter, promoter, producer, manufacturer, distributor and user) is actively on the scene, both the industry and the American public will benefit, as well.

"Simplify the machine!" would seem to be the admonition made in emphatic tones by the purchaser to the design engineer, the manufacturer and the distributor. Even though mechanical complexity is most difficult to avoid, with the extension of function, the expansion of range and the increase in capacities demanded, operators and users are becoming more articulate in their demand that streamlining be carried further and deeper than simple outward appearance. Maintenance requirements are no less stringent, despite a marked degree of improvement in technical skills and abilities of the average crews and operating personnel active in today's fields.

There continues to be real concern, and some uncertainty, in equipment design and production, respecting such factors as moving costs and both statutory and physical restrictions and limitations upon weight and dimension on the road and in the field. A current lack of uniformity among the states in their highway regulations serves further to complicate the situation. Apparently one sound conclusion to be drawn may be expressed as, "Lighten it except wherein weight itself is a basic factor for stability, or wherein it is of no effective moment in the reduction of cost in either production or portability."

Hydraulic and combination hydraulic-pneumatic systems are coming into their own in the transfer and transmission of power for mechanical rigs equipped with internal combustion engines. The many new units, new designs and applications borrowed from other heavy industries, have stimulated intense interest and experimentation. The variety of fluid - element units on the market, hydraulic - couplings, torque converters, motors and drives, together with automatic or semi-automatic transmissions certainly promise better performance, lower engine maintenance costs and longer life for drive elements. Efficiencies have been improved, power loss and wastage somewhat reduced, and the further development in automatic two- or three-speed transmissions will further assure additional gains. The cushioning effect provided by the elastic or resilient elements in line-of-drive for shock and impact absorption between power plant and point-of-work continues sedulously to be sought. Engineers seek to utilize explosive combustion without extreme energy loss and with minimum mechanical disturbance. Drilling rigs, well work-over and servicing units, pump drives and mobile units have thus far claimed the most concerted effort in this field, although it may be presumed application may well follow in the so-called stationary installations.

Air-clutches of both the air-actuated and air-operated and controlled types are being applied generally to oil equipment. The envelope, tube, doughnut or labyrinth types, some used with and some without disc or friction-plate adjuncts, have come into rather wide use and in the main have proved satisfactory, fast and effective.

The Texas Co. recently put into service the largest power rig afloat designed to drill to 20,000 feet in Louisiana coastal waters. The 189-foot Lee C. Moore derrick has a working capacity of 1.5 million pounds. Four diesel engines provide up to 2,000 hp for the National drawworks. Photo courtesy National Supply Co.

Air controls and combination air - hydraulic-electric of both the fixed-panel and the console or movable types have also had intensive trial and have attained acceptance. Several manufacturers have changed or modified basic component elements, such as braking systems, to avail themselves of power-assisted controls to obtain more effective function, finer gradation and sensitivity of control and at no great premium in initial cost per unit.

Dual-fuel engines in the comparatively light-weight, multiple-cylinder, moderate or high-speed types, are being introduced in oil field power plant use for drilling rigs, servicing equipment and in some field power stations. This type uses a small percentage of diesel fuel for ignition by compression and principally natural gas or petroleum gases for power combustion. As with the full-diesel type, the heart of the works is in the injection and fuel-flow-control system. This dual-fuel feature should serve further to expand the desirable characteristics needed for both wild-catting, where gas is not readily available, and in proven territory where free gas may be furnished to drilling operations, with little change required for either full-diesel or dual-fuel use. Tests earlier in 1950 show promise, and little premium is involved in initial engine cost to the purchaser.

In recent months extensive development of more economical types of drill bits and drilling systems, for conventional, shot-hole and core drilling, indicates possible increases in intensity of research in this direction. Exploration in some areas has been too expensive to "shoot" or core due to glacial moraine and drift sections encountered. Some type of percussion drill-bit or system may be the answer. It is to be noted that the trial and development of percussion drilling systems in conjunction with rotary methods is in progress. Two such systems are being used now. One was developed by a major oil company and is testing in the West Texas chert section. The other is now in experimentation in California. Both employ the hydraulic principle, or a combined hydraulic-mechanical apparatus. Still another type under trial in light drilling employs a patented, simplified, straight-mechanical "hammer," with most successful results in shallowed boulder and glacial-drift gravel sections, where shot-hole work had been abandoned as economically or physically prohibitive. More may be expected in these fields, and the need is great for less costly penetration in the extremely hard, compact chert section in the Permian basin area in particular. In the latter area the percussion type bits in conjunction with rotary have operated effectively and promise material savings. All three types deserve closest attention and investigation.

Much effort and ingenuity is being expended to produce a practicable, effective means of input-torque measurement and control for use with mechanical power rigs. A requirement, or at least a highly desirable feature, of such a device, applicable in line-of-drive for rotary tables for instance, would assure limiting controls to prevent drill-pipe twist-off and consequent fishing jobs. It would make available valuable data concerning the factors involved in rate of penetration, bit condition, formation resistance characteristics. All of these are valuable in analysis and control of drilling operations. For electric-powered rigs or rotary tables such controls are rather readily available. For mechanical (or combustion engine) power it appears some use of fluid couplings in line-of-drive may serve to afford the practicability of such measurement and control. Electro-magnetic clutches likewise might be used in some such applications.

Portable or mobile-type radio-telephone equipment in field use, not yet a commonplace but no longer a novelty, is now in general adoption for far-flung operations. Seismological surveys, pipeline construction and operations service companies and drilling-contractors have found the system advantageous. Its use will doubtless increase. The general hook-up with earth-bound communication lines makes for a happy combination and extension of utility.

Serious reconsideration of the possible advantages of slim-hole drilling and casing programs and practices is noted among some operators who are most assiduously analyzing overall completion costs and economic returns. The industry still seems to have strong preferences for so-called standard drilling and casing programs. Some or much of this feeling may be because of consideration for fishing jobs, for later well-reconditioning, possible eventual well-deepening (though rarely actually engaged in), and perhaps for ultimate salvage values. We hold no brief for either view but observe that the subject merits thorough analytical study.

The expiration of basic patents on some cone-roller type bits seems to have introduced quite a number of challengers with hats in the ring. Presumably those concerns which pioneered and followed through in this phase of the business and this type of equipment will strive mightily to retain their positions and will offer greater service and services than before. Additional efforts by all those so engaged, old and new, cannot but benefit users and drilling in general.

Also new in the means proposed to accelerate the return flow of drilling muds carrying cuttings is a patented tool to be used in the string above the bit proper, to divide, divert and direct a part of the fluid into its upward course in the annulus between drill pipe and hole wall or casing. In

Drawworks designed to drill to 10,000 feet with 4½-inch drill pipe. All controls for the unit are grouped in a skid mounted console for location at any convenient point. Motors may be used singly or compounded. An electro-magnetic brake is flexibly attached to the drum shaft for normal setting of slips without use of the friction brakes. Photo courtesy The Wheland Co.

Skid mounted 300 hp oilfield boiler weighing 18,500 pounds complete with knee-action stack, feed pump, burner, controls, valves and piping. Unit has rated output of 10,000 lbs/hr with 100 percent overload capacity.

substance it is similar to a subcoupling but with replaceable jet-sleeves in the apertures through the wall of the tool, through which a portion of the mud flow is thus diverted. The function serves to "jet-assist" upward flow of the total fluid, the remainder of the column less that diverted having carried on through jets in the bit proper in the conventional manner. Clearance of cuttings from point of contact in the formation being drilled by blade or roller-cone is more fully accomplished, return velocities stepped up and "re-grinding" of cuttings eliminated or greatly reduced.

During the past year additional investigation has been conducted into jet bits and jet drilling operations by the research and development division of one of the major oil companies operating in Texas. Field work involving the drilling of over 100,000 feet of hole—all operations closely supervised, observed and studied—now affords much new data. Some conclusions may be noted: (1) In drilling by rotary, holes cannot be simply "washed down." (2) Penetration is not accomplished by simply more mud pressure, volume, velocity and greater circulation. (3) Properly supervised and regulated from predetermined data and in the light of experience, however, circulation can and does assist materially in rate of penetration and improved well condition. (4) It would seem that the true function of mud or drilling fluid is to clear the hole of cuttings, assuring their dissipation from cutting blade or rollers' point of cutting action in formation being drilled.

Several additional types of straight-lift pumping units appeared in test in 1949-50. One employs a hydraulic pump and piston-lift, multiplied by stationary-type "block & tackle" arrangement, and through traveling counterweight assures easy balancing and truly perpendicular polish-rod travel of long stroke. Others of the pneumatic ram-type seem to be improvements upon previous applications.

Drilling operations increasingly require a closer adherence to and application of practical chemistry as requisite today in the treatment, control and use of drilling mud, circulator fluids for well control, rated penetration, lifting of cuttings and general well-conditioning during drilling testing and for completion. The mud-engineer is noticeably present at the rig, and his formulas and recommendations are rather closely followed. Equipment manufacturers grant that this factor begins to merit their study and consideration in subjects of design, metallurgy, chemic-reaction upon both metals and particularly packing elements not too closely evaluated heretofore. These studies will indicate the necessity of some changes in equipment packing, closures, seals in all machines or units in direct contact with such chemically-treated muds, to avoid accelerated deterioration and so to lessen maintenance problems and reduce down-time.

In some areas there is evident some return to steam power for drilling and rig operation. Comparatively light-weight, fast-steaming boilers together with more practical feed-water treatment and control enhance the prospect to some extent. Conventional steam equipment where fuel and fairly good water are available is still used rather consistently in extremely deep drilling, both in deep wildcat exploratory tests and in a good share of marine and offshore drilling operations.

A monster pipeline trencher, weighing 33 tons, 50 feet in length, now in use tears out a ditch 44 inches wide, 5½ feet deep, at the rate of better than a mile a day. Other semi-automatic machines follow, applying preservative treatment and wrapping to the steel pipe, laying a continuous string back of the welders at nearly the same rate.

Offshore and marine work is effectively expanding in scope, but there is still no cheap or easy means to undertake such drilling. The national defense war goods surpluses, including L-type vessels, are not yet exhausted, but even with economical bottoms, these drilling outfits, rigged out, run into heavy six and seven-figure outlays. Overall operations in the Gulf of Mexico offshore exploration would indicate that so far, it is reported, production has cost not less than $300 per barrel recovered to date. The role of the pioneer is expensive. This work is certain to continue and expand in the offshore search for petroleum and oil production.

Borrowed in idea from the automotive superservice station, a new unitized lubricating system machine, air-powered, pressure-controlled to protect oil seals in machines to be lubricated, and affording long grease-hose feed off from spring-mounted winding reels is now being marketed for drilling-rig use. The system affords economies in lubricant, seals, down-time and assures ease of proper and timely greasing machines every tour.

Portable masts or derricks have very nearly completed the conquest of permanent structures in the oil production division of industry and continue their inroads on business formerly held by erector-type structural derricks in the drilling division as well.

Electronics and x-ray testing of sucker-rods in operation for stress, fatigue, electrolysis, crystallization and damage or destruction by corrosion in well pumping operations gains headway. Extended experiments in metals such as K-Monel and other alloys offers hope in the search for greater resistance characteristics and longer life of rods.

The market in rigs and drilling equipment should hold up moderately well in the United States, as the replacement factor should be high. A great number of the 2,200-odd rigs available after hard service the last eight or nine years deserve salvage disposition. New work, field and area extension, probably will be maintained; and new concerns in drilling and entrepreneurs in development likely will continue to enter the picture at a normal rate. Most observers agree that the petroleum consumer market continues to broaden steadily.

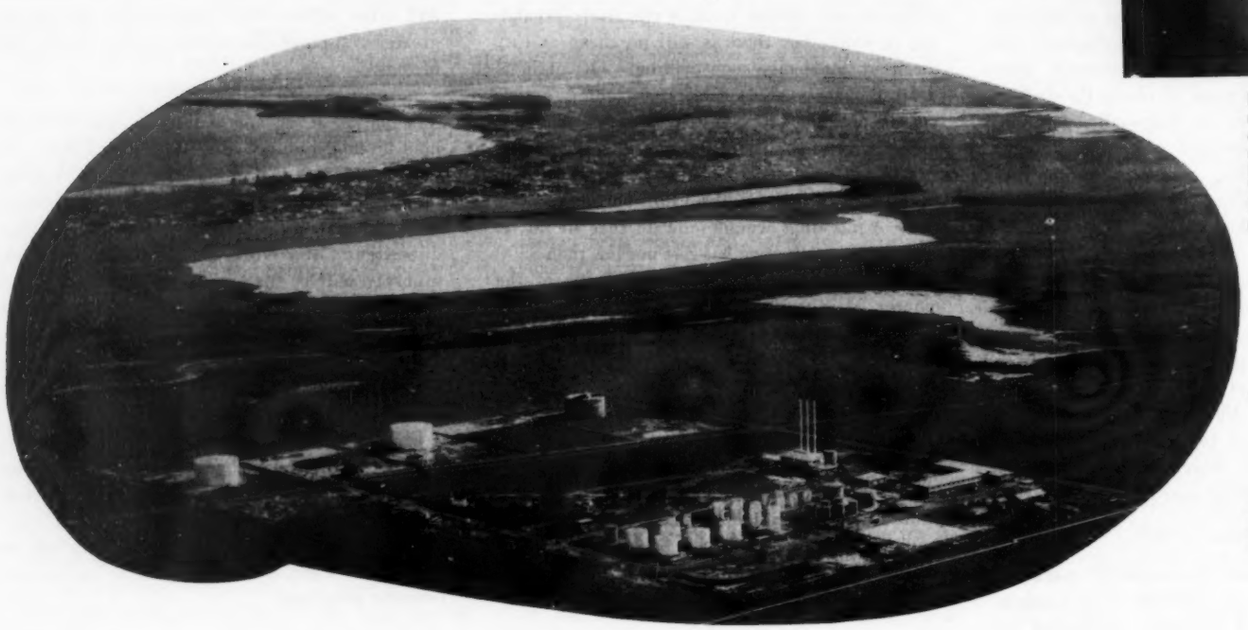
Production equipment volume should hold its own in demand from completions to new work and should show some increase in well work-over, well-conditioning, servicing and testing equipment, and especially in additional secondary-recovery programs.

Driller's console which may be located away from drawworks to permit more flexibility on jack knife rigs. All air hose lines are connected to a manifold which may be disconnected as a unit and cannot be wrongly reconnected. Photo courtesy The Wheland Co.

The Zublin "snake," especially designed tool for repairing earthquake damaged wells in the Long Beach harbor area in California. Several hundred wells were damaged by a quake which kinked pipe at a depth of 1,700 feet. Photo courtesy McCullough Tool Co. ⟶

NEW AUSTRALIA REFINERY PRODUCES LUBES FROM NEW GUINEA CRUDE

Minister for Supply and Development R. G. Casey fills the first drum of lubricating oil under the smiling supervision of P. W. Parker, chairman of Standard-Vacuum Oil Co., New York, and Harold Rabling, chairman and managing director of Vacuum Oil Co. Pty. Ltd.



General view of the Altona refinery looking southwest toward town of Altona and Port Phillip Bay.

THE first barrel of lubricating oil manufactured in Australia from Dutch New Guinea crude was filled by the Australian Minister for Supply and Development, The Rt. Hon. R. G. Casey, at an impressive ceremony held at the Vacuum Oil Company's refinery at Altona, near Melbourne, on Feb. 20, 1950.

Three hundred federal and state parliamentarians, government departmental heads and leading Australian industrialists attended the ceremony. Also present were P. W. Parker, chairman of Standard-Vacuum Oil Co., and L. V. Collings, vice president and general counsel, both of New York, who were visiting Australia and New Zealand on a business trip.

In his address Mr. Casey said, "Our circumstances demand that we should make a large, rapid and sustained increase in our population. This entails a similar large increase in the development of our natural resources and in our industries, so that we can accommodate, house and provide for the large annual population increase that we are planning for.

"No one can pierce the mists of the future, but I think it is not too much to hope that, before very long, we will see a large modern oil refinery in Australia, complete with a cracking plant that will enable us to produce more of the motor spirit that is the life blood of a young and widespread country such as Australia.

"We estimate that the rate we are planning to expand our population and our manifold activities in Australia will need a total of public and private investment of something like £200 million a year. We need the 'know-how' of those great worldwide enterprises such as the Standard-Vacuum Oil Co., which enables the most modern and advanced industrial methods to become established on Australian soil," said Mr. Casey.

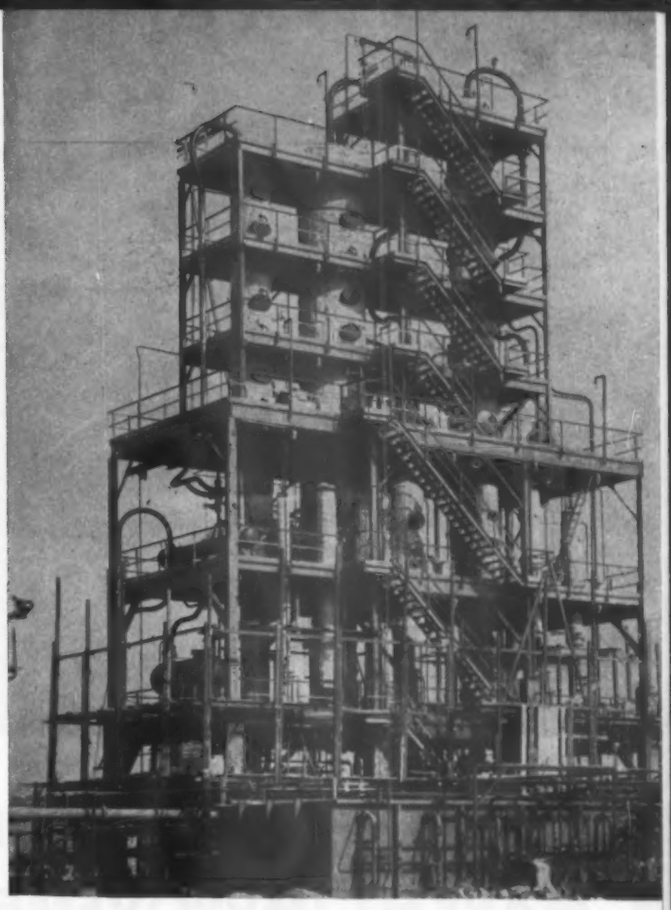
Giving some background material concerning the Klamono field from which Australia's first shipment of New Guinea crude was received, Harold Rabling, chairman and managing director of the Vacuum Oil Co. Pty. Ltd., said that back in 1935 a company in which Standard-Vacuum holds substantial interest was granted a concession covering 20 million hectares in the Vogelkop and Bomberai regions of northwest Dutch New Guinea. That region in prewar years was practically unexplored, and tremendous difficulties caused by the dense tropical jungle and heavy rainfall had to be surmounted. Air reconnaissance was used extensively to prepare the basic maps required by geologists for their studies.

February 1939 saw the first well commenced at Klamono, and developments there proceeded more rapidly than elsewhere in the concession. In fact, by the time war broke out in the Pacific, 14 wells had been drilled of which eight were productive. As the result of war the company lost about 90 percent of its equipment, and a fresh start had to be made in 1946.

Work was begun on the construction of an ocean terminal at Sorong, and an eight-inch pipeline was laid 32 miles through the jungle from the Klamono field to Sorong. The first tanker shipment of crude was made in December 1948—13 years after the concession was originally granted. Production was increased to 500 tons a day, and it was expected to reach 650 tons a day this year. This particular crude is unusual in composition, containing only a minor proportion of the light fractions which make petrol and kerosene and a large percentage of fractions from which lubricating oil and bitumen can be made.

Mr. Rabling said, "Altona refinery is the only plant in Australia which treats crude oil without any preliminary processing or blending at the source. We are not yet equipped to make lubricating oils suitable for airplanes or motor cars,

Control room being inspected by (left to right): S. G. Cruikshank, refinery superintendent; H. W. McCobb, director, Standard-Vacuum Oil Co.; A. M. Old, chief construction engineer, Vacuum Oil Co. Pty. Ltd.; Harold Rabling, H. C. Smith, operations director, Vacuum Oil Co. Pty. Ltd., and R. N. Keppel.



Fractionating equipment in course of construction

but we can manufacture half the lubricating oil required by the railways, industries and agricultural machines of this continent. We make enough bitumen to surface 2,000 miles of road every year and have already delivered sufficient to pave the Princes Highway from Melbourne to Brisbane."

P. W. Parker, chairman of Standard-Vacuum Oil Co., said, "The search for oil in Dutch New Guinea has been going on for almost 15 years. There has been spent in that project so far approximately $60 million, and it was only in late 1948 that oil was first produced (presently 4,700 barrels a day). If projected schedules are realized, it will still be 1954 before that company shows any net earnings over and above money being put in for development and operation. Incidentally, by that time it is anticipated there will have been put into the venture $97 million.

"This crude which comes from the Klamono field is the result of years of search in difficult terrain and would not be available, were it not for careful planning, hard work and the expenditure of large sums of money. However, this crude has little value in its present form; consequently this Altona refinery has been constructed to process such crude for economic use.

"Still nearer home, and perhaps of more interest to Australia, is the search for oil now going on in Papua, in which we also have an important interest. Nearly £7 million has already been invested in operations there, and so far, unfortunately, without the discovery of any oil. However, a thorough determination of the oil possibilities of that part of your country will be made. The oil prospects are still just as good as they were when that venture was started, and we are still hopeful that these efforts will eventually be successful," said Mr. Parker.

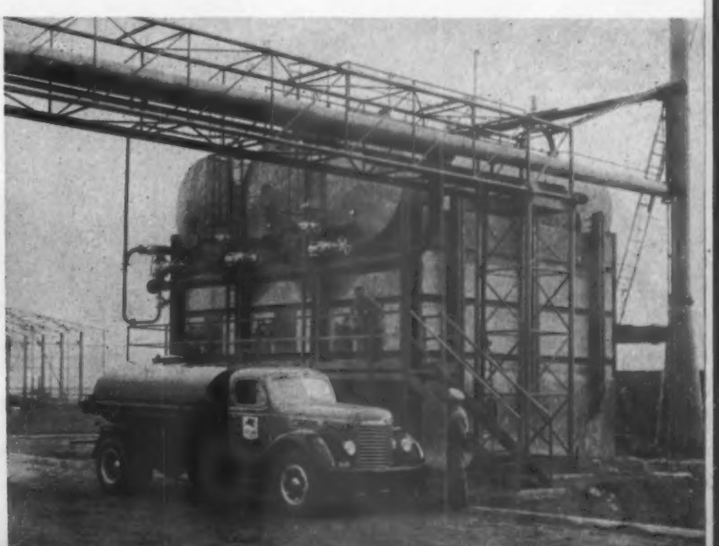
"I mention these examples to illustrate two points: (1) The time and very large amounts of capital it takes to develop oil in a new country; and (2) that only organizations with large financial resources can undertake such developments and expect to survive. These matters frequently are overlooked.

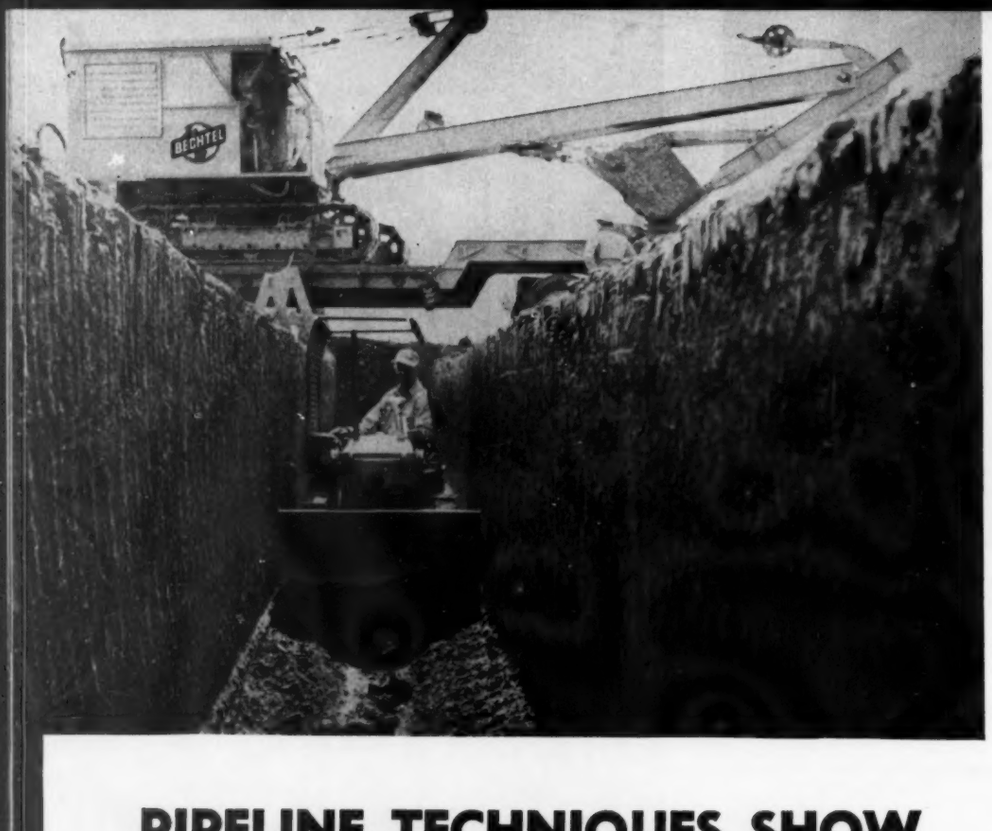
"I want to assure you that we are interested in developing and increasing trade between the United States and Australia, insofar as such development and increase do not adversely affect the relations of Australia with its sister nations in the British Commonwealth. It seems to me that American capital investments, combined with the experience and scientific knowledge gathered over the years could be made in Australia by American enterprise, to the mutual advantage of both countries.

"Such American investments would assist in and expedite the development of industries in Australia and thereby make possible the production of additional goods and merchandise needed, not only by Australia, but by its neighbors; and at the same time, raise to an even higher level the high standard of living which Australians have so long enjoyed," said Mr. Parker.

Salt water pumping station showing electrically driven transfer pumps and emergency diesel unit.

Bitumen reheating plant with insulated tank wagon for delivery to consumers.





A handy tool on a big inch line is this tiny tractor with a cable controlled 45-inch blade designed by Supt. Bob Bowman of Bechtel Corp. Steel side wings were added to protect the operator from falling clods or rocks.

Nested lengths of 30 and 31-inch pipe being unloaded for the western end of the Trans-Arabian pipe line at Beirut, Lebanon. The nesting greatly reduces transportation costs.

PIPELINE TECHNIQUES SHOW MARKED IMPROVEMENT DURING VAST POSTWAR BUILDING BOOM

THE tremendous postwar expansion in the world's system of pipelines for the transportation of crude, refined products and gas has been accompanied by developments in the techniques of line-laying as well as in operations.

Since the close of the war some 60,000 miles of new line has been laid and put into operation. Despite this activity, there is no immediate prospect of a cessation of building. Line completions in 1949 totaled nearly 20,000 miles, and more than 15,000 miles of new line was laid, of which roundly 2,500 miles was in foreign areas and 12,500 miles in the United States.

Construction projects planned for early completion at the beginning of the year totaled about 40,000 additional miles. Line completions in 1950 probably will exceed the 1949 total of 20,000 miles, and a larger proportion is expected to be in countries outside the United States.

Canada is in a dominant position in current building with the 1,150-mile Interprovincial line from Edmonton to the head of navigation on the Great Lakes and the new 18-inch Portland-Montreal crude line which will double the present capacity. The original international line was laid during the war to save the 1,000-mile trip around the Gaspé peninsula and down the St. Lawrence to Montreal. It permitted operation also during the five winter months when the St. Lawrence is frozen. Canada also is likely to see the construction of some major gas lines to the Pacific northwest.

In the Middle East the Trans-Arabian line is proceeding apace. Kuwait Oil Co. is building an extensive gathering system, and plans are proceeding for the future construction of the Middle East line from Iran to the Mediterranean and the

Above—Lining up section of a large diameter line for welding at the point where it crosses two other lines presented an unusual problem recently. Below—cleaning and priming a 360-foot section of big inch pipe. Photos courtesy International Harvester Co.

Kuwait 30-inch line across Arabia. The entire Middle East program will not be complete for another six years.

In Latin America Mexico is building and planning a major system of gas, products and oil lines. Argentina has completed its big 1,000-mile gas line and is building more crude lines as part of its ambitious national development plan. Colombia is planning a group of important products lines over difficult mountain terrain to reduce its present transportation difficulties.

Most of the new lines which extend for long distances and are in competition with water transportation are of large diameter. The "Big Inch" system laid during the war showed that large-diameter lines can compete with water on a cost basis where large volumes of oil can be moved on a regular basis and where the direct pipeline mileage is considerably shorter than the water mileage. Many of the new lines are economically feasible only because several companies find it possible to pool their shipments from a common group of producing areas to a compact group of refineries.

Pipeline-laying techniques have undergone marked changes in the past few years, with the result that lines are laid more quickly and more cheaply. The internal line-up clamp now in use on large-diameter lines has been instrumental in expediting welding. The clamp brings welding edges into exact alignment allowing tack welders to operate at a rapid pace. With thin-walled "big inch" pipe, the claim aids in restoring roundness of ends which have been destroyed during transportation. Once the joints are welded, modern portable x-ray equipment examines the joints and eliminates much subsequent work during pressure testing.

Mechanical bending machines have been instrumental in saving much time for pipe-laying crews in shaping pipe to the contour of the trench. Larger and more powerful high-speed tractors have contributed their share in handling modern large pipe. Modern doping and wrapping machines are preparing pipe for long life underground when equipped with cathodic protection.

Engine manufacturers have contributed greater savings in fuel in their newer designs. Intense research during and since the war has added greatly to the efficiency of prime movers. Dual fuel engines and gas diesels have been introduced and improved. Largely increased horsepower of individual units has cut station cost. On the large-diameter oil lines the pumping job has largely been given to centrifugals. Some development has been done in this direction on gas lines also. The War Emergency lines employed electrically driven centrifugal compressors when they were converted from oil to gas, but the main consideration was availabiilty of equipment for a rapid change-over. Now gas centrifugals have been improved in efficiency to the point where one major new gas line is to install steam turbine driven centrifugal compressors. Intensive research is being made on gas turbines but they have not been adopted by the industry.

Pipelines are making wider use of radio, particularly two-way mobile units for construction and testing of lines in remote areas. In addition microwave radio relay has been adopted as a replacement for wire communication in continuous pipeline operation and control work. Some observers believe that multi-channel microwave radio systems will permit the development of a robot pipeline system with unattended stations, the whole system being operated from one central control room.

Keystone Pipe Line Co., a subsidiary of Atlantic Refining Co., recently abandoned a 60-mile leased wire between Montello and Philadelphia and replaced it with a Federal microwave pulse time multiplex radio relay in the range of 1,850-1,950 megacycles. The system provides facilities for continuous unattended telephone, telegraph, telemetering and remote control service on one RF channel. The PTM system features an ultimate capacity of 23 speech channels. Only five were used at the outset, the remaining being held in reserve for possible expansion. As is the case with FM systems, the microwave PTM requires line-of-sight operation so that repeater stations must be installed in rough country. These are unattended in routine operations, however.

Transcontinental Gas Pipe Line Corp. is considering installation of a microwave system over the entire length of its new 1,800-mile line from South Texas to New York City. Such a system would involve the installation of a minimum of 600 stations at 30-mile intervals.

A new and economic application of two-way FM mobile radio-telephone for use in the construction and testing of gas pipe lines was recently put into practice by Ford, Bacon and Davis, Inc., during the building of a pipeline for the Michigan-Wisconsin Pipe Line Co., which will supply natural gas from Texas to Michigan and Wisconsin. Unlike most standard two-way radio systems, this equipment operates in a mobile-to-mobile hookup by using two radio-equipped vehicles as mobile ground stations and an airplane flying over the pipeline acting as the central station. Mainly responsible for the success of this system is the airplane, which can fly over the route as rapidly as is required to keep a visual check from the air and make the necessary reports to the ground stations. Because FM radio permits only a line-of-sight transmission, the airplane is always in a position while in flight to be within line-of-sight of the mobile ground units.

Standard Oil Co. (Ind.) products pipeline department has equipped rolling laboratories with two-way FM mobile radio-telephone units to speed up cathodic protection surveys. Survey crews now can cover larger areas in shorter time and have accurate reports of the test progress.

Planes are being adopted generally by the industry for pipeline patrol work. Losses due to breaks and costs of line-walking are cut by plane patrols because of the great length of line which can be observed each day by small planes.

In the United States 89 planes are used to conduct aerial patrols. The planes tracking the pipelines skim along at altitudes from 200 to 700 feet, at speeds of 100 miles an hour or less. Pipeline pilots think little of spotting a leak as small as a couple of barrels from 200 feet or more. There are records of even finer pin-point spotting. The current issue of The Lamp, published by Standard Oil Co. (N.J.), cites the report turned in recently by a repair crew of Interstate Oil Pipe Line Co., a Jersey affiliate: "Crew arrived at location given by pilot 18 minutes after report. Repaired leak at coupling. Total loss of oil, one quart."

Mechanical devices for bending pipe to conform to line contours have speeded pipe line laying. Photo courtesy The Coody Bender Co.

Completing the final weld in Iraq Petroleum Company's 16-inch line from Station K-3 to Tripoli. This line was welded at the rate of two miles daily in rough and desert country.

CONTRIBUTIONS OF THE REFINING INDUSTRY TO THE FRENCH NATIONAL ECONOMY

By B. de Rochefort

B. de Rochefort, author of this article, is a consulting petroleum problem engineer, graduate of Ecole de Travaux Publics and Ecole Nationale Supérieure du Pétrole et Combustibles Liquides, in France. Since 1928 he participated as construction engineer in the erection of three of the most important European refineries, Berre, Port-Jérome and Martigues, in France. He worked six years as refinery department chief engineer and petroleum port superintendent.

During the war he was a front-line combatant in Belgium and in France and became Captain of French Artillery. After the war he was delegated by the French government as petroleum expert in the Allied Control Council in Germany and as head of liquid fuels supply of French military government in Austria. He is presently in charge of the technical department of Chambre Syndicale des Raffineurs de Pétrole in France. . .

Cracking unit at the Berre plant of Cie de Raffinage Shell-Berre.

IN ITS present state of rehabilitation the oil refining industry is proving to be a powerful factor in the improvement of the French national economy. Based on 1949 operations, it is calculated that the industry saves the nation more than 35 million dollars annually. At the end of the year the saving was at the rate of $11 million quarterly. In addition to the important service to the nation in saving dollars, the refining industry contributes to the state in many other ways, such as in providing employment for a substantial number of skilled workers and technicians.

The oil refining industry prospered for many years in France under the protective tariff law of 1873 which permitted free entry of crude while placing comparatively high import duties on refined products. In 1903 this period of growth and prosperity came to an end with the imposition of a tax on domestic refining. Thereafter the French industry was stagnant until after World War I, when France obtained an interest in Iraq oil.

The so-called "Pineau Laws" of March 1928 finally permitted the establishment of a powerful refining industry in France and allowed the erection there of the first major European refineries. Within the next ten years before the outbreak of World War II, the French refining industry reached first place in Europe. Although the industry was largely destroyed during the war, it has been rebuilt with extraordinary rapidity and is operating on a scale which saves the country large amounts of foreign exchange in spite of the high costs of French manufacturing, due to the unfavorable conditions under which French manufacturers are working in comparison with foreign competitors. These conditions now appear to be growing worse because of the general economic state of the country, with the result that France is not in a favorable position to export refined products into world markets.

The recent drop in finished products prices, which was not followed by a corresponding drop in crude oil prices, emphasizes France's unfavorable position as an exporter. It will not be possible to alter this position as long as the French refining industry, geographically distant from the main sources of its raw material, will be dependent upon foreign supply for its crude.

The market for petroleum products in France itself and in its territorial possessions, where tariff protection can be effective, is quite large. French domestic needs totaled 45 million barrels in 1938, but the war-caused dislocation of the economy brought consumption below 10 million barrels in 1945 and 1946. By 1947 consumption was back to the prewar level and now is a third greater than in 1938.

The modernization plan of the French refining industry forecasts the processing of 136.5 million barrels of crude during the 1953 fiscal year, compared with runs of 74.6 million barrels in 1949. It is estimated that French domestic demand in 1953 will be 99 million barrels and that French overseas territories will require an additional 24.5 million barrels of products. French refining capacity is expected to be large enough in 1953 to process 136.5 million barrels of oil, enough to permit the export of some oil if world competitive conditions permit profitable trading. Table I gives aggregate French plant capacity, crude runs and domestic consumption in recent years compared with prewar 1938.

As mentioned previously, the French refining industry is not in a position to refine and export substantial quantities of petroleum products because virtually all raw materials must be imported from great distances at a considerable cost for freight. Table II shows that in the third quarter of 1949 only 100,241 barrels of domestic crude was processed by French refineries out of a total run of 20,851,629 barrels. To the average fob price of $2.12 per barrel in that quarter, the French refiner had to add 93 cents for ocean freight, bringing the cost of imported crude to $3.05 per barrel. Freight rates from various countries from which crude was imported are shown in Table III.

A study has been made by the author to ascertain the average financial result of refinery operations in France. Official statistical data published by the Centre Intersyndical du Pétrole, the Chambre Syndicale des Raffineurs de Pétrole and the Commission Paritaire des Produits Finis Pétroliers (official price control commission) have been used in the calculations.

The average balanced French Atlantic ports cif prices and conversion factor between franc and dollar values have been determined as follows: The official Price Control Commission determines for each calendar month the finished petroleum products cif prices on French Atlantic ports, available from the first to the last day of the month. This determination is done referring to the world market prices (fob Mexican Gulf)

TABLE I

French Refinery Activity and Domestic Consumption

(Thousands of Barrels)

	1938	1945	1946	1947	1948	Fiscal 1949
Domestic consumption of refined products	43,428	9,490	8,337	43,603	52,149	60,072
Domestic refinery production	43,712	2,022	18,390	32,390	55,334	68,657
Refined Products imported	8,760	13,140	16,790	12,410	6,833	4,628
Refinery capacity at end of year—B/D	163	39	79	145	244	250
Crude Runs—B/D	137	6	56	100	165	204
Crude Runs—B/Yr.	50,128	2,111	20,480	36,673	60,321	74,588

and freights ascertained during a 30-day (or 31-day) period. This reference period starts at the 21st of the month and ends on the 20th of the following month. (Example: to determine September prices, the reference period starts July 21 and ends August 20.)

At the end of each month the Price Control Commission estimates these data, completes them with any information it may collect concerning deals concluded on the market during the same reference period and determines in consequence the official cif prices becoming available in France during the following calendar month.

The conversion factor between the franc and dollar values is determined monthly by the same Control Commission as follows: the daily dollar quotations on the Paris Stock Exchange are noted during the reference period (working days only). The average value of these quotations (say for instance, 330.13) is compared with the legal rate of exchange of the French Fonds de Stabilisation des Changes, which was, during the three quarters 1949, 214.71.

The mean of these two figures, 330.13 plus 214.71 divided by two, equals 272.42 and is the value of the dollar-francs conversion factor for the month. The conversion factor and cif prices shown in the third quarter tables are the average values of July, August and September 1949.

Since the franc devaluation on Sept. 29, 1949, the rate of exchange (214.71) of the French Fonds de Stabilisation des Changes is no more taken into account for calculation of the conversion factor. This factor is now determined only as the average value of the daily dollar quotations on the Paris Stock Exchange during the reference period (recently about 349 francs per dollar). As indicated in the tabluations, the French refining industry created a currency of $0.26 per barrel in the third quarter of 1949. The cost of raw materials imported was $3.05 per barrel and the cif value of finished products $3.31. Total currency saving in the third quarter was $5,421,424. Similar calculations will show savings of 52 cents per barrel in the first quarter of 1949 before refined oil markets softened, and a saving of 40 cents in the second quarter. Total saving in the first quarter was $10,403,746 and in the second quarter $8,356,637. For the nine months the total was $24,181,807.

Because of the methods used by the Price Control Commission, devaluation of the British pound and of the French franc in September had no effect until November. In that month crude imports were 81 percent from the Middle East and 19 percent from Venezuela and Colombia. Crude cost is $1.99 per barrel before freight and $2.85 delivered in France. The shift in source from Latin America to the Middle East lowered both the cost of crude at point of origin and the freight rate to French ports. Net reduction in crude cost was 20 cents per barrel in November and December when compared with the third quarter. At the same time there was an increase of 24 cents per barrel in the value of French refined products after currency devaluation. Net result was an increase of 44 cents per barrel in dollar exchange savings to 70 cents. Details of the change are shown in Table V.

The figures of Table V show that the difference between the currencies saving factors before

(Please turn to page 78)

TABLE II

Imported Crude Oils Treated, Third Quarter 1949

Origin	Barrels	FOB Cost $1/bbl.
Iraq	3,139,168	$2.56
Saudi Arabia	6,652,137	1.87
Kuwait	6,059,445	1.75
Iran	182,655	1.80
Middle East	16,033,405	
Medium Oficina	461,723	2.50
Mulata	835,426	2.65
Tia Juana	742,180	2.50
Lagunillas	1,672,352	1.90
West Tara	146,103	2.80
La Paz	107,742	2.53
Venezuela (several)	184,991	2.50
Dificil	352,504	2.74
Latin America	4,502,949	
Webster (U.S.A.)	215,034	2.85
Total	20,751,388	
Average FOB Price		2.12
Average Freight Cost		.93
Average CIF Cost		$3.05

TABLE III

Freight Cost on Imported Crude—Third Quarter 1949

(Dollars per Long Ton)

Origin of Crude	Atlantic Ports	Mediterranean Ports	Average
Middle East:			
Iraq	$4.29	$2.52	$3.405
Arabia	8.58	6.73	7.655
Kuwait	8.97	7.12	8.045
Iran	9.13	7.28	8.205
Venezuela & Colombia	5.15	5.31	5.23
U. S. A. (Gulf)	6.02	6.65	6.335
Average freight per long ton			$6.593
Average per barrel			$0.93

Note: Average exchange rate 272.42 francs per dollar

TABLE IV

Quantity and Dollar Yields of Finished Products Obtained by French Refineries, Third Quarter 1949

(Conversion factor from dollar to franc—272.42)

Products	Production Barrels	Obtained Yields % Weight	Average CIF Prices c per U.S. gal.	Obtained Values (c per bbl. crude run)
Liquefied gas	246,758	0.77	12.15	6.09
Aviation gasoline	67,000	0.26	17.59	2.29
Motor gasoline	5,050,760	19.75	11.09	112.83
Special naphthas	53,569	0.20	16.38	1.72
Straight-run gasoline	23,612	0.09	10.79	0.52
White Spirit (solvent)	57,739	0.23	14.15	1.56
Jet fuel	18,421	0.07	11.40	0.36
Kerosene	309,437	1.33	8.64	5.26
Gas-oil	3,692,077	16.72	8.30	61.61
Distillate (parafinic)	12,949	0.06	7.44	0.21
Domestic fuel oil	651,433	3.08	8.00	10.47
Light fuel oil	588,949	2.88	7.07	8.33
No. 1 Fuel Oil	550,708	2.77	5.87	6.51
No. 2 Fuel Oil (heavy)	6,905,669	35.25	5.47	76.19
Lubricants	352,296	1.74	15.23	10.78
	Pounds		c per lb.	
Parafin waxes	3,516,110	0.05	8.86	1.41
	Short Tons		$ per Short Ton	
Road oil	1,368	0.04	14.9727	0.10
Cutbacks	70,800	2.17	22.3230	7.60
Bitumen	136,425	4.18	24.0471	15.73
Several secondary products	11,074	0.33	13.7931	0.73
Gas and losses	261,694	8.03		
	Barrels			
Total	20,851,629	100.00		330.00c
Cost				304.00
Difference				26.00

TABLE V

Comparison of Financial Results Before and After Devaluation

(Thousands of Barrels)

	3rd Quarter 1949 Before Devaluation	November 1949 After Devaluation	Difference
Product Value	$3.31	$3.55	$0.24
Crude Cost	3.05	2.85	0.20
Currency Saving	$0.26	$0.70	$0.44
Conversion $ to Francs	272.42 Fr.	349.39 Fr.	76.97 Fr.

EXPLORATORY DRILLING IN 1949 INCREASED 13 PERCENT

DURING 1949 the oil industry in the United States drilled 9,058 exploratory wells, according to the annual report of the committee on statistics of the American Association of Petroleum Geologists headed by F. H. Lahee. In 1948 the total of exploratory wells was 8,013. Of the wells drilled last year, 1,830 were producers and 7,228 were dry. Total footage was 8,359,690 in producing wells and 26,438,601 in dry holes.

The AAPG committee made inquiries regarding the information upon which the drillers of wildcat wells acted in selecting their locations. According to reports received, 464 new-field wildcats that were drilled on technical advice, based on geology and geophysics, were successful, and 3,143 were dry holes. Of the holes that were drilled without technical advice, 11 were producers and 367 were dry. Besides these, 30 producers and 433 dry holes were located for reasons about which no information was given. Among the new-field wildcats, seismographic methods are credited with finding 248 producers and debited with 896 dry holes.

These figures are of interest in showing the ratio of success to failure in the petroleum industry's sustained effort to find new oil. The figures show that 12.9 percent of the holes drilled on technical advice were producers, as contrasted to 3.0 percent successful in the case of holes located without such advice.

For viewing the exploratory effort as a continuing whole, one of Mr. Lahee's tables will be of interest, for it shows in detail the relative success as measured by the number of producers in comparison with the number of dry holes in each year from 1944 to 1948 inclusive.

The data show that, on the average during the last six years, for every foot drilled in successful new-field wildcats, 6.12 feet were drilled in dry new-field wildcats. In other words, for the 12,697,431 feet drilled in 2,428 successful wildcats

Relative Success of Exploratory Drilling

	New Field Wildcats		All Exploratory Wells	
Year	Dry Holes per Producer	% Successful Wells	Dry Holes per Producer	% Successful Wells
1944	8.05	11.05	4.08	19.67
1945	7.63	11.59	3.62	21.64
1946	8.39	10.65	4.06	19.76
1947	7.80	11.32	3.90	20.34
1948	7.57	11.66	4.50	18.25
1949	7.79	11.37	3.95	20.20
Average	7.85	11.29	4.02	19.90

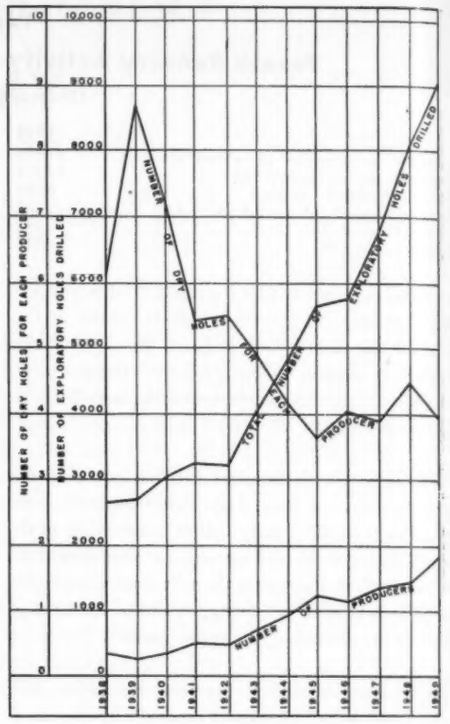
in the six years from 1944 to 1949 inclusive, the industry drilled 77,741,298 feet in 19,061 dry new-field wildcats. And let it not be forgotten that relatively few of the so-called successful wildcats discovered major fields. Many were on the border line between economic success and failure. These are significant facts which should be considered by those who, directly or indirectly, would stifle the industry's ambition for exploration.

The statistics show that in the country as a whole in 1949, 845 new-field wildcats (172 producers and 673 dry holes) were drilled by major oil companies; 3,329 new-field wildcats (306 producers and 3,023 dry holes) were drilled by minors and independents; and 275 new-field wildcats (28 producers and 247 dry holes) were drilled by minors or independents with the drilling financed by major companies.

Comparing exploratory drilling in the United States in 1949 and 1948, the report notes the following:

(1) In number of exploratory holes drilled there was an increase of 13 percent, and in exploratory footage drilled there was an increase of 6.3 percent. The increases in 1949 over 1947, based on 1947 figures, were 33.7 percent in holes drilled and 31.8 percent in footage.

(2) Considering only the new-field wildcats, 1949 witnessed an increase of 3.56 percent in holes drilled and a decrease of 3.1 percent in



Trend of exploratory drilling in the United States and ratio of dry holes to producers.

footage drilled compared with 1948. Compared with 1947, the corresponding figures in 1949, both increases, were 27.8 and 24.2 percent respectively.

(3) In California, Illinois, Indiana, Texas and Wyoming there were large increases in exploratory drilling in 1949 contrasted with 1948, but there was a decrease in Kentucky, New Mexico, New York, Ohio, Pennsylvania and Tennessee.

(4) The average depth of hole for all exploratory drilling decreased from 4,086 feet in 1948 to 3,842 feet in 1949. Again this year, Louisiana holds the record (7,922) feet for average depth of exploratory hole, and Mississippi is again second with 6,975 feet.

Exploratory drilling in western Canada was slightly more successful than in the United States; 262 holes were completed, 58 producers and 204 dry. Drilled footage was 1,130,563 feet, of which 243,343 feet was in producers. This means that 21.37 percent of the exploratory holes and 21.52 percent of the footage were successful. In eastern Canada 85 exploratory holes were drilled; all but 12 were new-field wildcats, and none of these wildcats were successful. Seven of the 85 exploratory holes were successful, all as gas wells and all in southeastern Ontario.

In Mexico 51 exploratory holes were drilled with a total of 272,963 feet; 14 holes were successful, seven as oil wells and seven condensate producers. Of the 51 holes, 23 were new-field wildcats and three, or 13 percent, were successful. All were drilled on the basis of technical advice.

Complete report of Dr. Lahee's committee will be published in the June issue of the AAPG Bulletin.

EQUIPMENT INDUSTRY IN GREAT BRITAIN MADE RAPID PROGRESS IN 1949

By C. H. W. Roles

ALTHOUGH British owned oil companies control a substantial proportion of the world's output of oil, yet little crude oil is produced in the British Isles. In fact the whole British Empire produces a very meagre proportion of the world's crude. It is the contemplation of this latter fact which brings into correct focus the extraordinary development of the petroleum equipment industry in the United Kingdom. Great Britain has always been renowned for her shipbuilding, which is not surprising for an island population for centuries dependent upon the sea lanes of the world for trade. It is as natural a phenomenon as that the United States of America should have—as indeed she has—the finest petroleum equipment industry in the world: for after all, America was the birthplace of the modern oil industry.

That the petroleum equipment industry in Britain should have made the great progress it unquestionably has, is a sign therefore of considerable engineering adaptability, and as such, deserves much praise. That other circumstances conspired to make possible such a development is well known and accepted but a fundamental ability to learn quickly and adapt personnel and plant to something quite literally foreign was a sine qua non if progress was to be made and maintained.

The pattern of the industry has not changed during the past year. Expansion in production has been continuous and more British companies than ever before are manufacturing equipment for the oil industry. It has been stated authoritatively in the last few months that 97 percent of all British requirements of essential refinery equipment can now be obtained in the United Kingdom—a quite astounding advance. The volume of equipment ordered for export during the year declined, a situation which occurs at intervals in the oil industry. That situation has not been confined to Great Britain and at the time of writing sales curves have already begun a steady rise once more. The refinery projects which are being developed in the British Isles caused a considerable increase in the demand for equipment.

Particularly spectacular has been the development of the range of instrument manufacture: this branch of the industry was singled out for special praise by a prominent oil company official a few weeks ago.

The Council of British Manufacturers of Petroleum Equipment reflects the growth of the industry in its increased membership. This has grown at a rapid rate throughout the year and the council's work in its many spheres of activity has greatly increased.

During the year the second edition of the council's composite catalogue "British Petroleum Equipment" was published and distributed to all parts of the world. The edition is considerably larger than its forerunner and comprises more than 500 pages of catalogue matter. A third edition is being prepared which both in size and content will easily outstrip the two previous editions. "British Petroleum Equipment News," a quarterly magazine issued by the Council, has proved successful in its work of disseminating trade news of the industry.

The oil companies have continued to give the utmost encouragement to the industry as a whole and individual manufacturers have reason to be grateful for the help and direction received. This active co-operation is most valuable to the Council of British Manufacturers of Petroleum Equipment: the essential work of liaison between consumer and supplier is made simple when meetings between the two bodies, for the frank interchange of views and problems, can be arranged as a matter of course.

The oil companies and the council have always exhorted manufacturers to send their best executives to those parts of the world where oil is produced and treated, there to see for themselves how the equipment of the industry operates, a thing which until quite recently has been impossible in Great Britain. During the past year the response has been tremendous and a large number of executives have indeed visited all parts of the world to see for themselves.

Resulting from this welcome tendency to visit oilfields and refineries overseas, and to assist members unfamiliar with conditions abroad, the Council of British Manufacturers of Petroleum Equipment has formed an Overseas Advisory Committee drawn from members with an intimate knowledge of the conditions prevailing in most parts of the world. Their knowledge is pooled, the data provided by them is broken down into individual countries and areas, and this detailed information is distributed to members who are intending travellers. The value of such information can be readily appreciated in a world overstocked with regulations and forms.

At home in Great Britain construction is proceeding steadily on the domestic refinery program. Designs and supervision are to a considerable extent by the English branches of American specialist organizations who are members, or though their chief executives, honorary members of the Council of British Manufacturers of Petroleum Equipment. British manufacturers supplying the equipment will thus be able to watch performance on large scale refinery operations of their products at home. The first catalytic cracking plants in Britain are now reaching the site construction phase. To a country still on gasoline rationing this work must surely augur better times in store.

To American industrialists it is pleasant to be able to report the increasing co-operation between them and British companies. The practice of granting licenses to manufacturers of petroleum equipment in the United Kingdom is extending all the time, and some very important links have been forged during the past year. From many points of view the American and British equipment industries are developing into a working partnership. American designers earn dollar royalties for U.S.A. firms who gain entry or maintain existing connections in the European purchasing market by their connection with British fabricators.

The technical committees of the council have achieved much good work during the year. Representatives from these committees, together with delegates from the oil companies, work together on the Petroleum Equipment Industry Committee of the British Standards Institution. This committee has as its object the standardizing of British made material to bring it into line with corresponding American material. A number of Standards on these lines have been published.

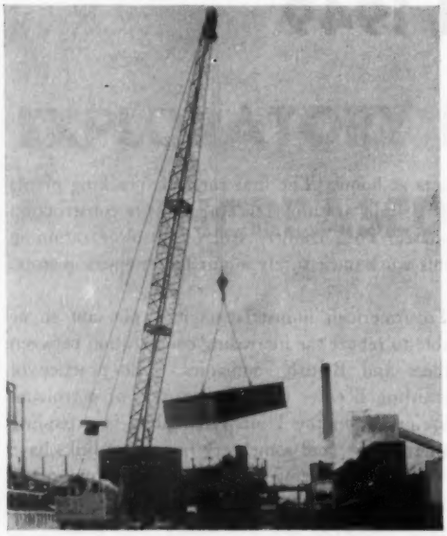
If this article exudes a certain self satisfaction on the part of the British equipment industry it is deliberate. The reader should not, however, take it too literally. The satisfaction is displayed because of the continued progress of the industry, but this has not been achieved without much criticism, some deserved, some perhaps undeserved. The industry has a very long way to go, much to learn, much to develop. But the will to do these things is well in evidence, and surely that is more than half the battle.

12½-Ton Self-Propelled Crane

Meeting the demand for more flexible handling in heavy industry, Steels Engineering Products of Crown Works, Sunderland, have produced a 12½-ton Coles mobile crane, model 90028, which is said to be the largest pneumatic-tired crane of its type in the world. This new model is available for either petrol/electric or diesel/electric operation. The crane has four motions: hoisting, derricking, slewing and traveling, each being operated by separate electric motors which are controlled from the driver's seat on the revolving superstructure. Hoist, derrick and slewing motions are stopped by electro-magnetic brakes, thus making the machine extremely safe in operation. All crane motors have reversing switches which automatically reverse the steering gear when the driver faces rear of chassis. The controls are also fitted with all the latest safety devices.

The superstructure can be revolved completely around

the chassis in either direction. When handling heavy loads, the chassis is jacked with outriggers to provide a fixed base, but with loads of 8½ tons and under, the crane is fully mobile.



With a standard 30-foot jib and outriggers in position, the crane is designed for a maximum load lift of 12½ tons at 10 foot radius. Proportionally lighter loads can be handled at longer radii up to a maximum of 29 feet, at which loads of 3½ tons can be lifted. With an 80-foot job and outriggers in position, ¾ ton can be handled comfortably at 70-foot radius. Fully mobile, without outriggers, fitted with standard 30-foot jib, loads can be varied from 8½ tons at 10 feet to 2¼ tons at 25¾-foot radius.

Operational speeds on level ground are: hoisting, 10 tons at 15 feet per minute down to two tons at 90 feet per minute. Derricking, maximum to minimum radius in 90 seconds. Travelling, up to four miles per hour unloaded.

Spiral Plate Exchangers

The Roseblad design of spiral plate heat exchanger is being manufactured by Ashmore, Benson, Pease & Co., Ltd., associated with The Power-Gas Corp. Ltd., Stockton-on-Tees and London. The design is used by oil and other chemical industries for liquid to liquid, as a condenser or for heat recovery from vapor.

The heating surface consists of two plates of suitable material rolled up, one within the other, to form concentric spirals. The plates are connected to one central header and two headers at the periphery of the heat exchanger. The spiral plates, together with the headers, form two independent passages through which the media flow during the heat exchange. By correct proportioning of the width of the spiral plates and the spacing between them, the most efficient flow of both heating and cooling fluids is obtained, both in regard to heat transfer rate and pressure drop. The high efficiency of the spiral heat exchanger contributes to compact design, thus saving weight and space.

Stewarts & Lloyds Exhibits

Stewarts and Lloyds Ltd. with subsidiary and associated companies are again exhibiting a wide rang of their products at this year's British Industries Fair. The exhibits give an indication of the increasing use being made of steel tubes in a great variety of fields and illustrate the large contribution which S&L products are making to present-day reconstruction and development.

In the engineering group a reception stand staffed by representatives of the company is at the service of visitors for all inquiries relating to the exhibits and trade and technical matters generally. The principal S&L outdoor stand has been divided into 10 bays in which a comprehensive range of the company's products is on view. These include oil country tubular goods and welding fittings.

The Victaulic Company Ltd's exhibits include a full range of Victaulic flexible joints and fittings, Johnson couplings, coupling flange adaptors, screwed Johnson couplings and hose couplings in sizes ranging from ½-inch to 100 inches diameter. Recent developments for Standard Victaulic joints include a higher range of pressures. Joints up to four-inch nominal bore are designed for 600-pound working pressure; in sizes from four to six inches, 400-pound working pressure. Higher pressures can be catered for by special joints.

Tubewrights Limited, another Stewarts & Lloyds subsidiary, is displaying a selection of tubular steel fabricated products designed to satisfy the increasing demand for tubular steel fabricated equipment where a high strength to weight ratio is essential.

Outside Studs for 1500-Pound Separators

A. P. Newall & Co. Ltd. of Possilpark, Glasgow are supplying their Newallastic studs for connecting the flanged sections of gas-oil separators for the Middle East oil fields, working at 1,500 psi pressure. The studs are 2¾ by 23½ inches and the threads are generated to BS.88-1940 close fit and are protected in transit by a plastic dip.

To ensure uniform tightening of the joints, the studs are finished to a length of plus or minus .002 inches so that, when tightened up, the extension can be measured by a micrometer. The accompanying photograph gives an idea of the size and finish of this vitally important component and shows the waisting of the body of the stud to 10 percent below the root diameter of the thread to relieve stress concentration.

"Mighty Antar" Tractor

The "Mighty Antar" tractor (named after the famous Arabian poet and warrior) has been built to fulfill the Iraq Petroleum Company's pipe-stringing requirements on their new 30-inch line in the Middle East, running for 560 miles across the desert from Kirkuk to the Port of Banias on the eastern Mediterranean coast.

In the early part of 1949 the Iraq Petroleum Co. made it known that it would require a number of large-capacity pipe-laying vehicles for their new project. It can, therefore, be considered an outstanding achievement on the part of Transport Equipment (Thornycroft) Limited, London, that, ten months after the requirement was first made public, the "Mighty Antar" was designed, built and on the road for testing. The results of the tests being satisfactory, visitors recently were privileged to see a full demonstration of this power unit, operating on rough ground similar to that used for testing out mechanical equipment for the services, in conjunction with a crane semi-trailer, also specially designed for the project, and carrying a load of 70 tons, the gross train weight being approximately 100 tons.

This particular tractor, with machinery carrying semi-trailer as demonstrated, is shortly being shipped to the Middle East, where it will be used as a training unit for drivers and maintenance personnel, as well as for pipe-stringing practice.

The whole project, which will require many such vehicles, has as its objective 1.5 million tons miles of transport per month, over desert tracts and sandy wastes, rising to a maximum height of 3,500 feet, with temperatures ranging from 20°F in winter to 120°F in the shade in summer. Each length of pipe weighs 6.75 tons and is 93 feet long. For work under these onerous conditions, special care has had to be exercised in the provision of sealed, dust-proof bearings and filtered air intakes to avoid undue wear in all moving parts. The power unit is a Meteorite 101, eight-cylinder engine made by the Rover Co., developing 250 bhp at 2,000 rpm.

Delanium Carbon

Powell Duffryn Ltd., London, has produced a new kind of carbon which has been named Delanium to suggest the quasi-metallic properties of the material. Delanium is claimed to be the most versatile form of carbon yet placed upon the market because it exhibits good mechanical strength and ability to be fabricated to specifications with close tolerances. It retains the traditional qualities of chemical inertness and thermal conductivity. Delanium, moreover, is free from two serious defects which have hitherto restricted the use of carbon in chemical engineering, namely, porosity and permeability to the flow of liquids and gases, and the difficulty of making it of a fine, homogeneous texture.

The basic discovery that made Delanium possible was the observation that over a carefully controlled range of temperature, a jellified carbonaceous mass would decompose and simultaneously harden and shrink. The shrinkage can be so great as completely to close up the pores which would otherwise result from the decomposition.

(Please turn to Page 62)

Antar tractor-trailer unit developed for pipe line construction work in the Middle East.

another important project

uses BORN UPFLO heaters

Levelland Gasoline Plant
Levelland, Texas
Operated by
Stanolind Oil and Gas Company

BORN Engineering Company

ENGINEERS and CONTRACTORS

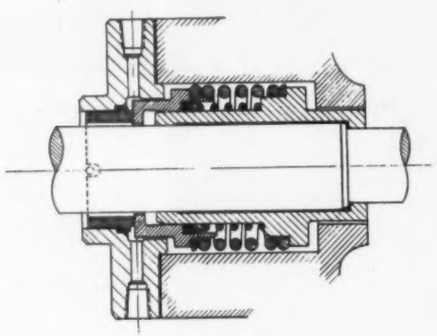
TULSA, OKLAHOMA

Representatives: LOS ANGELES, CALIF., G. R. Nance & Co. — SHREVEPORT, LA., Bass Sales & Equipment Co.
HOUSTON, TEXAS, Sales Engineering Co. of Houston, Inc. — NEW YORK, N. Y., Richard Morton
Canadian Associates: BRANDON, MANITOBA, Canadian Brown Steel Tank Co., Ltd.

In addition to the conventional tubular heat exchanger, a new cubic heat exchanger is made possible by the high compressive strength, impermeability, close-grained texture and accurate machinability of Delanium. It consists of a Delanium graphite block perforated by rows of parallel holes, each row at right angles to those above and below. The fluid to be heated or cooled is led into and out of the block by means of Delanium headers bolted to opposite faces of the cube. By suitable arrangement, single, double and three or four-pass systems can be obtained. This cubic heat exchanger occupies about one-eighth of the floor space and one-sixth of the volume of an equivalent tube-bundle type of exchanger. An additional advantage is that it can easily be opened for cleaning by removing the carbon or cast iron headers. After removal of the headers, it is a simple operation to clean through the holes in the block.

Flexibox Seals

Flexibox Limited, manufacturers of mechanical seals for oil refinery process pumps, have recently moved to new works and offices at Nash Road, Trafford Park, Manchester. As a result of continuous research, the introduction of a new type of mechanical seal was



recently announced. This seal incorporates Tefluon for the resilient components and is, therefore, suitable for handling all acids and alkalis.

The new seal, known as type RRT, is made in the same full range of models and sizes as the standard Flexibox mechanical seal, type RR. The United States licensee for Flexibox Limited is Otto H. York Co. Ltd., East Orange, New Jersey, who will handle all inquiries for that territory.

Testing Instrument Guide

A "Comprehensive Guide to Electrical Testing Instruments" has just been published by The Automatic Coil Winder and Electrical Equipment Co. Ltd., Douglas Street, London. Copies are available on request. A number of new instruments of interest to workers in the field of electronics were recently displayed at the Physical Society exhibition at the Imperial College of Science. Included was the "AVO" electronic testmeter. Refinements of the basic principles embodied into this instrument can be seen in the eighty-range electronic testmeter type "W" and the precision valve voltmeter of particularly high accuracy. Various accessories are available for use with the electronic testmeter, one of the most important being the electronic test unit which is capable of producing readings which are normally quite outside the scope of all but the most highly equipped laboratories.

Steam and Production Costs

Spirax Technical Bulletin No. 16, just out, will be very acceptable to firms using steam for process and heating, as it offers suggestions for improving steam economy. Copies are available from Spirax Manufacturing Co. Ltd. of Cheltenham, who published a previous edition two years ago. There was an instant demand for it, and the supply went very quickly. The present Bulletin is the latest edition, revised and brought up to date. It is concise and eminently readable with easy-to-follow diagrams.

In a number of directions the recommendations in the bulletin, besides offering quick ways of economizing steam consumption, point the way to an improved plant output efficiency with a consequent reduction in production costs. It is noted that prominence is given to the need for more accurate measurement of steam consumption as a fundamental requirement of the costing system. It is a timely plea which ought not to be ignored, for the measurement of process steam consumption is surely at the very root of production costs and economy. The bulletin draws attention to the value of an indicating steam meter on the steam supply to each main department as well as at the boiler mains.

United Steel Brochures

Member companies of the United Steel Companies Ltd. have published a group of brochures describing the part each plays in the production of ferrous metals and giving specifications of value to the buyer. Annual production capacity of the group is about 1.3 million tons of pig iron and two million tons of steel, about an eighth of the national production of the United Kingdom. Employees total 31,000.

Products of the various plants in the group range from slabs up to 17 inches in thickness down to strip at one-thousandth of an inch. Metal producing companies included are: Appleby-Frodingham Steel Co., manufacturers of basic iron and basic open hearth steel in the form of rolled bars, joists, sections, plates, sheet piling, mine arches and props and constructional engineering assemblies; Steel, Peech & Tozer, manufacturers of acid and basic open hearth steel in the form in ingots, forgings and rolled blooms, slabs, billets, bars and wheels and tires for railway rolling stock, also makers of railway springs and tire, wheel and axle assemblies; United Strip & Bar Mills, manufacturers of steel strip and bars; Samuel Fox & Co. Ltd., manufacturers of electric steel and acid and basic open hearth steel in the form of ingots and rolled blooms, slabs, billets, bars and rods, also makers of cold rolled steel strip, steel wire, stainless steel in various forms, heavy road vehicle springs and umbrella frames; and Workington Iron and Steel Company, manufacturers of hematite and refined irons and acid Bessemer steel in the form of rolled blooms, slabs, billets, bars and rails, also makers of pressed steel sleepers.

The newly-published brochure produced by Samuel Fox & Co. was reviewed in the April issue of World Petroleum (page 52). The Appleby-Frodingham Steel Co. brochure, titled "Low Alloy High Tensile Steels," deals with metallurgical, engineering and economic aspects of the special steels produced by this company. Steel, Peech & Tozer has prepared two booklets. One deals with facilities of the company, and the second, titled "Phoenix Standardized Rapid-Machining Steel," is a 40-page handbook of physical properties, specifications and standards of products offered. United Strip and Bar Mills has published a book, titled "Hot-Rolled Strip" giving detailed information about the mill and its products.

British-Built Well Servicing Unit

First of ten high capacity truck-mounted oil well servicing units ordered by Shell for overseas service left London recently for Cabimas, near Lake Maracaibo, Venezuela. The unit, built by Woodfield Hoist Co. of Rochester, England, weighs approximately 25 tons. It comprises either a single or double drum diesel hoist with a telescoping tubular steel mast of 60,000 pounds capacity, mounted on a Leyland "Super-Hippo" truck. The mast can be jackknifed to a horizontal position on the truck for travelling.

Both truck and hoist are fitted with 125 hp Leyland engines. The hoist is driven through a hydraulic torque converter. Air starting of the engine is provided to minimize fire risk in the gas-laden atmosphere at the oil well-head. By providing two speed ratios, a wide speed-load variation is obtained by the hoist, up to 25,000 pounds direct pull with fingertip control. Fully

mobile, with power-operated hydraulic mast-raising gear, the equipment has a rig-up and tear-down time of approximately 10 minutes. The hoist is rated for servicing wells up to 7,000 feet in depth and for carrying out workover jobs to 5,000 feet. A rotary table drive is provided for drilling up to 2,000 feet.

Details of design were carefully supervised by Shell's oil field engineers, and special requirements were met by Leyland Motors Ltd. with the truck and hoist power unit and by Stewarts and Lloyds Ltd. with production of the mast.

Fire-Resisting Concrete

William Kenyon & Sons Ltd., Dukinfield, England, and 136 Liberty St., New York, has developed a new fire-resisting concrete which is sold under the registered name of "Kisol Fire-resisting Concrete." The major ingredient of this concrete is the mineral Vermiculite in its exfoliated state which is capable of withstanding temperatures up to 2,000° F. This concrete is supplied in 112-pound bags but simply requires the admixture of the correct quantity of gauging water on site, when it can be applied by trowel or poured in shuttering. Structural steel work is first enveloped in small mesh expanding metal (metal lath), the contained cavity being filled with Vermiculite granules, mineral wool or brick rubble. Due to the complexity of petroleum plant supporting structure, it is usually found to be more economical to apply this material by trowel when it can be applied in approximately ¾-inch layers. Kisol Vermiculite concrete when dry weighs less than half that of normal sand concrete and is several times more fire-resisting.

Kisol fire-resisting concrete as applied at an oil refining plant. The structure is over 100 feet high and is fireproofed to a height of 25 feet to prevent collapse in the event of fire.

(Please turn to Page 64)

AEROCAT

FLUID CRACKING CATALYSTS

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MOTOR OIL ADDITIVES

...add more power to sales!

Better cracking catalysts mean higher octane fuels. Improved additives mean greater motor lubricating efficiency. And both mean greater satisfaction to the motorist—more power for the sales effort . . . new opportunities for aggressive merchandising!

American Cyanamid Company lends a hand by steadily applying its extensive research facilities to the development of improved synthetic fluid cracking catalysts and motor oil additives. And Cyanamid chemists find great satisfaction in helping you, our customers, benefit by more profitable selling as the result of their research findings.

Let the specialized skill and experience of our technical service staff help you in using AEROCAT® Cracking Catalysts . . . AEROLUBE® Additives for regular, premium and heavy duty motor oils . . . AERO* Specialty Catalysts . . . Gasoline Dyes, Metallic Stearates and Drilling Mud Chemicals. Literature and samples of these products will be sent to you promptly on request. *Trademark

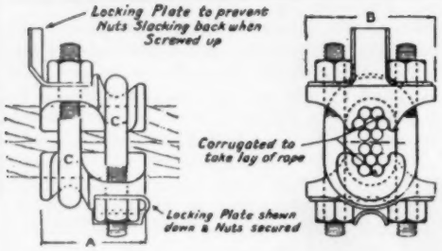
AMERICAN Cyanamid COMPANY

PETROLEUM CHEMICALS DEPARTMENT, DIV. B5

30 Rockefeller Plaza, New York 20, N. Y.

WHEN PERFORMANCE COUNTS . . . CALL ON CYANAMID

For further information in Europe, consult Cyanamid Products, Ltd., Brettenham House, Lancaster Place, London W. C. 2, England.



Oilfield Ropes

British Ropes Ltd., London, has published a new 1950 edition of its "Oilfield Ropes" brochure, containing specifications, tables of breaking loads and other data of value to buyers of wire, Manila, sisal and nylon ropes. Instructions for installing new ropes, care and maintenance, lubrication and handling of wire rope are described. Diagrams of various wire rope constructions are given with advice on the selection of the best design for a given job.

A double-throat clamp designed to prevent crushing of wire rope, such as occurs with the single clip, is illustrated in the section devoted to instructions for installing a new rope. The Bullivant's double-throat clamp is corrugated to take lay of rope and is equipped with locking plates to prevent loosening of nuts.

Plastic Packing

Crane Packing Limited has developed new pipe jointings, gland packings and valve seatings for use with chemicals and acids of a highly solvent or corrosive nature. Crane research found in a new plastic material, Polytetrafluoroethylene, a polymer containing carbon and fluorine atoms only. This is processed to produce a range of gland packings possessing unique properties. They are chemically inert, thermally stable, non toxic and have good mechanical properties and a low coefficient of friction. In their solid molded form C.F.2 gland packings will withstand the corrosive and solvent action of any known acid or chemical, even when they are handled at higher than average pressures or at temperatures as high as 450°F or as low as –60°F.

For less severe conditions other forms of C.F.2 packings are available, such as those which are constructed by spirally wrapping or braiding C.F.2 tape round a core of suitable material, or those composed entirely of C.F.2 tape in braided jacket over jacket construction. C.F.2 is also supplied in cord form for packing valve spindles and in loose shredded form for certain applications.

Self-Loading Truck for Oil Fields

During the past few years specialized vehicles to the value of over £3 million have been built by Leyland Motors Ltd. for the leading oil companies. The self-loading oil-fields truck which was exhibited at the recent New York show, and built for the Royal-Dutch Shell Group of companies, is typical of the Leyland trucks already handling and transporting heavy equipment over roadless country in the Middle East, Burma and South America.

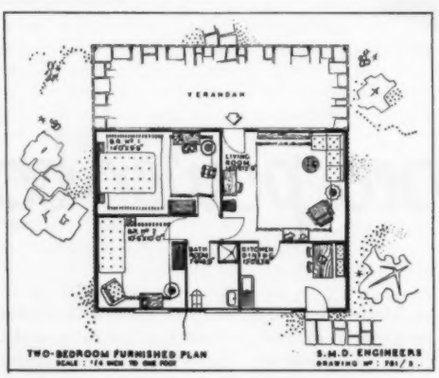
Power and running units of the sixwheel, heavy-duty truck are similar to those fitted on the standard four, six and eight-wheeled vehicles in the Leyland export range. The engine is a six-cylinder, direct-injection diesel unit of 600 cubic inches capacity. The robust five-speed gearbox is supplemented by an auxiliary gearbox with a step-down ratio of 1.328 to one. Air pressure brakes actuate on all six wheels and have a total braking area of 916 square inches for the footbrake alone.

The heavy-gauge steel platform body, built by R. A. Dyson & Co. Ltd. of Liverpool to Shell's specification, is equipped with a winch and gin poles for hoisting oil field machinery and equipment on its own back. The hoist gear can also be used as a mobile crane for the erection and dismantling of oil well drilling installations. Pieces of machinery weighing as much as 33,000 pounds or more can be loaded or unloaded off the truck by the winch alone. The winch is driven from the input shaft of the auxiliary gearbox and is controlled from the cab by means of a clutch lever and a handbrake.

Average rope speeds vary from 89 feet per minute at 1,800 engine rpm with fifth speed engaged to four feet per minute with the engine ticking over at 600 rpm and first speed engaged. At the rear end of the platform are the brackets on which the gin poles pivot. When not in use they are stowed in troughs along the side of the platform, but, when complete stowage is unnecessary, they can be hinged back to rest on a rack just behind the driver's cab.

Aluminum Oil Field Houses

Structural and Mechanical Development Engineers Ltd., Slough, Bucks, has developed a series of "Alframe" chalet bungalows for oil field use in either tropical or moderate climates. Two- and three-bedroom types are available for shipment in easily han-

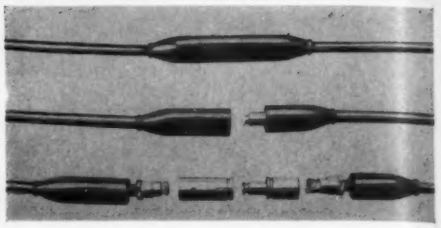


dled sections which can be erected by unskilled labor and dismantled for re-erection when necessary. Walls and ceiling are insulated with glass silk equal to an 11-inch cavity brick wall. All wooden members are termite-proofed. Interior walls and ceiling are faced with hardboard.

Quickly Detachable Connectors

The Lincoln Electric Co. Ltd. of Welwyn Garden City, Herts, has produced the RCM connector to eliminate disadvantages in other quickly detachable cable connectors. The connector proper is of the jack plug type with a simple, speedy yet positive locking action. Perfect contact is ensured by having a strong spring action on the contact surfaces, and the design is such that the electrical resistance is negligible. The parts are machined from light alloy, having a low specific resistance, low weight, high resistance to corrosion and great strength.

Previous quickly detachable connectors have had in many cases an insulated outer covering which was brittle enough to be damaged by rough usage and presented no barrier to moisture. The outer sheath of the RCM connector is of tough, natural rubber



which is a perfect insulation against electrical leakage and provides moisture protection due to the careful design.

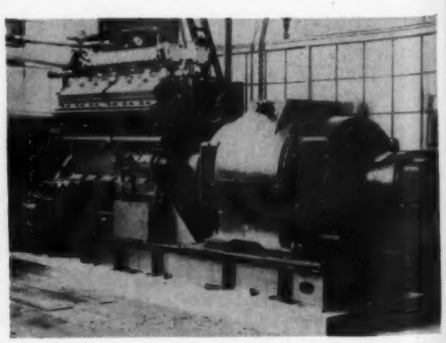
The method of fixing the cable to the connector is particularly noteworthy, as it has been found possible to design a strong, simple, solderless connection which ensures perfect contact, does not damage the cable and will not pull out even when severely overloaded. The only tool needed to fix the cable securely within the connector is one spanner. The new connector is designed with a smoothly curved exterior which will slide around obstacles easly, so saving time and minimizing the risk of damage.

Diesel Fuel Injector

C.A.V. Limited, Acton, London, exhibited its fuel injection equipment for diesel engines at the recent British automobile and motorcycle show at New York. Included was a large demonstration model of C.A.V. pilot injection. In this system a special cam form provides for admission of the first portion of the charge at a low rate (delay period); the pilot charge then commences to burn, following which the main charge is injected by a portion of the cam giving a high rate. Injection is continuous, but the quantity of fuel injected during the delay period is kept at a minimum, while the bulk is injected at a high rate to complete combustion as soon as possible but still under control and retaining full cycle efficiency. Very distinct improvement in quietness and smoothness of running of vehicles, especially during idling, have been achieved; diesel knock and the usual combustion noise of engines has been practically eliminated. A special form of nozzle is used, suitable for the lower operating pressure necessary for the pilot charge, and a special design of pump delivery valve is also used. The C.A.V. company is now actively embarking on a marketing policy in the United States.

Paxman Alternator Sets

Paxman diesel-driven alternator sets are being employed by oil companies in providing standby and emergency lighting as well as lighting for staff quarters and amenities. Illustrated is the Paxman 330 kva diesel generating set which comprises the Mark 12 RPH diesel engine flexibly coupled to a suitable alternator, the unit being mounted on a fabricated steel underbase. Starting is by 24-volt electrical equipment operated by a push-button. Owing to their self-contained nature, these sets are readily transportable and, when installed, the steel underbed usually dispenses with the necessity of a special foundation. Smaller sets are made also.



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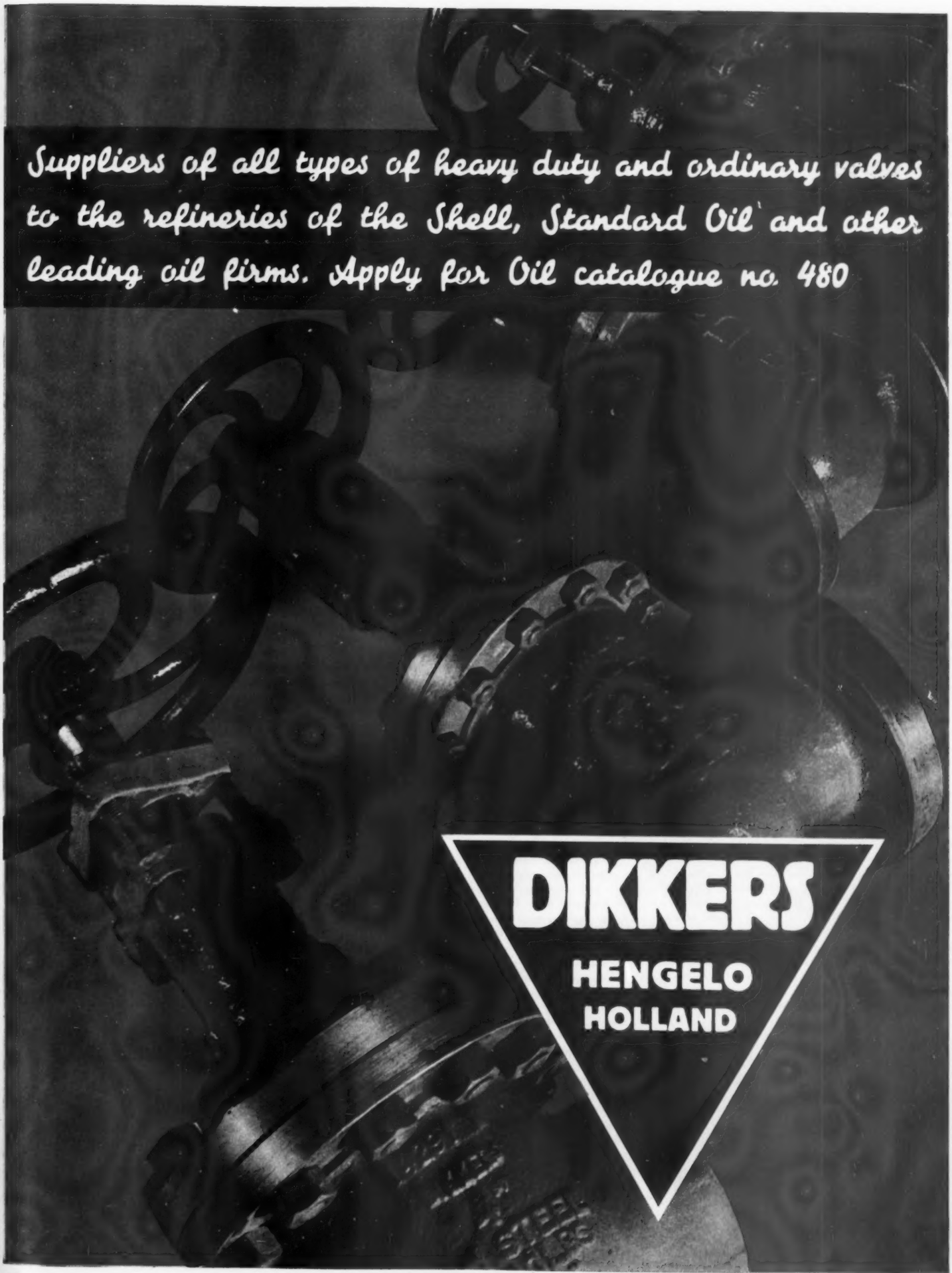
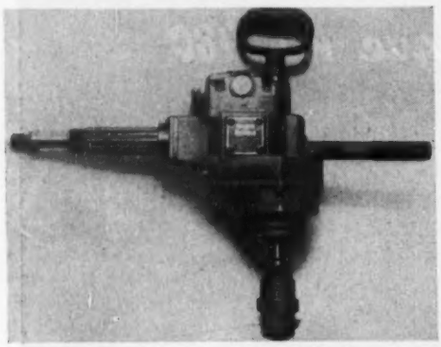

Suppliers of all types of heavy duty and ordinary valves to the refineries of the Shell, Standard Oil and other leading oil firms. Apply for Oil catalogue no. 480
DIKKERS
HENGELO
HOLLAND

Tube Expanders

Holman Brothers of Camborne has developed a series of tube expanders powered by vane type air motors, which retain all the desirable characteristics of the reciprocating engine. The power-weight ratio of the vane type motor is much improved over that of the reciprocating type. The heaviest machine for dealing with the largest tube weighs only 112 pounds as against the previous 200 pounds. Maintenance is low. The complete range of Holman machines will handle all sizes of tube at present employed. The smallest of these machines weighs 18 pounds and is particularly designed for dealing with condenser tubes and the like up to 1⅛-inch diameter. The largest is powered by a six bhp motor with an

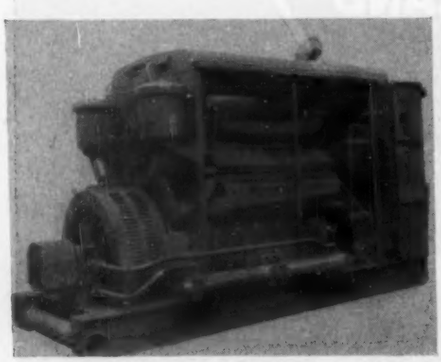


output spindle speed of 20 rpm. The torque at this speed is so high that the heaviest chrome molybdenum tubes at present in use can be expanded with ease. Complete with all extension handles this machine weighs only 112 pounds.

All machines in the range, with the exception of the heaviest model, may be obtained with morse taper socket for use with twist drills, etc. Square chuck adaptors for tube expanding are available as extra equipment. The larger sizes normally require two operators, one to control the motor, the other to hold the torque reaction handle. The smaller sizes require only one operator. In these a quick action control of the throttle and reverse is incorporated in the handle. This enables the operator to obtain a rapid reverse on the expanding mandrel and gives him complete control of the machine at all times. Safety features have been incorporated which are particularly desirable in confined spaces such as steam drums.

Oil Well Drilling Engines

Davey, Paxman & Co. Ltd. have developed several units for oil well drilling as well as additional diesel engines for electric power generation and pump drive. The Paxman range includes power units of 220, 480, 600 and 800 bhp and, while special requirements occasionally have to be met, a particular feature of the Paxman range is a standardized power set which is almost universally adaptable. The complete assembly is mounted on a substantial skid-type underbase and, being a complete entity, can be lifted off or replaced on the drilling rig, disturbing only the internal gear-type coupling on the driving end of the shaft. The



prime movers in the package sets are all of the Paxman RPH series. The six and 12 RPH develops 220 and 480 respectively, while for higher power applications the 600 bhp, 16 RPH and the 800 bhp, 16 RPHX (pressure charged) are employed.

Industrial Clothing

The complete range of North P.V.C. industrial clothing is shown on the James North & Sons Ltd. stand in the leather section, Earls Court, at the 1950 British Industries Fair. Two new developments shown for the first time are a specially supple men's P.V.C. glove for laboratory work which is made on an interlock fabric base affording greater sensitivity in use in precision work; and an advanced design of apron strongly reinforced where the ties join the garment with a lustrous satin-type finish.

Wide Range of Harvey Products

G. A. Harvey & Co. (London) Ltd. is displaying a wide range of products at the British Industries Fair. During the past few years this company has added considerably to its facilities for the fabrication of steel plate for the oil industry. Products include pressure vessels, autoclaves, fractionating and absorption towers in steel plate up to three-inch thickness and of any diameter and length, including a complete range of "Harco" "Rotarprest" ends, dished and flanged ends, channel, angle and flat bar rings.

A prominent exhibit is the new "Harco" glazed office partitioning. Hygienic in design to eliminate all dust crevices, this partitioning is also designed on the unit principle, thereby giving the greatest elasticity in arrangement and allowing alterations and additions to be made. Steel desks and tables, filing cabinets and locker and warehouse equipment is produced for export in a knocked-down condition.

Air Survey in Iran

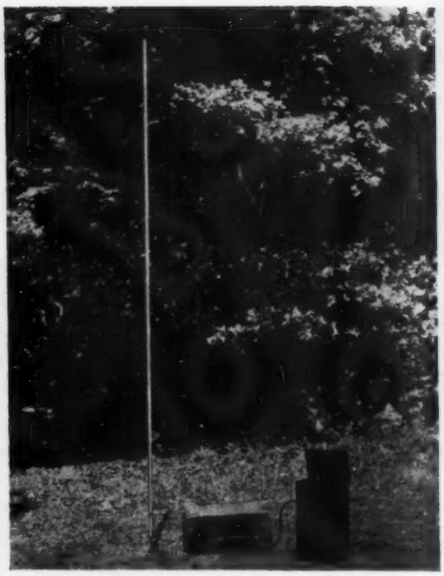
Aerosurveys of London is engaged in photographing thousands of square miles of southern Persia for the Anglo-Iranian Oil Co. Many years before and since the war Aerosurveys have sent out annually a survey expedition to Persia, progressively to photograph from the air the company's working areas for oil prospecting purposes. This year's expedition utilized the first post-war aircraft specially constructed for the work and manufactured by Percival Aircraft Limited. The aircraft is an all-metal, high-wing monoplane with tricycle undercarriage and two Alvis Leonides 520-hp engines. It has a range of about 1,000 miles, a ceiling of some 24,000 feet and speed range from 90 to 220 mph.

The survey aircraft carries a crew of three, pilot, navigator-photographer and radio operator; the latter two look after the operation of the camera during photographic runs. The camera compartment provides for a single vertical camera and a trimetrogon set up which includes a vertical and two oblique cameras, one on either side at an angle of, say, 60°, also a pair of split verticals and a forward oblique camera directed through the perspex nose of the aircraft. There are also movable windows on both sides of the plane so that oblique cameras may be used from either side or both sides at once.

When the pilot and observer have brought the airplane into the right position over the ground and on the required heading, the pilot, having engaged the auto-pilot, then connects the gyro magnetic compass to the auto-pilot. The gyro magnetic compass from then will monitor the auto-pilot on to the exact course selected by the observer, and for as long as required, for several hundred miles if need be, the plane will be held on that course in exactly straight and level flight.

New Decca Receiver

A new type of portable Decca receiver has been introduced for use in terrestrial geophysical reconnaissance. The receiver is in two units which weigh some 40



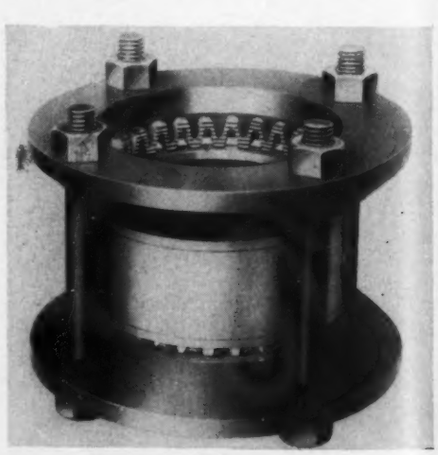
pounds each and are adaptable to several different methods of carrying. The set incorporates a new radio technique which compensates for the fix errors occurring when the receiving aerial is close to a tall tree; with this development, the Decca system now offers important advantages as a means of rapid position-fixing in geophysical work, particularly in country where visibility is restricted. Field trials have confirmed that the accuracy of fixing obtainable in heavily-wooded terrain is adequate for a wide variety of reconnaissance operations.

Microid Polishing Aluminas

Griffin and Tatlock, Ltd., London, has prepared a bulletin dealing with the application of microid polishing aluminas for the rapid scratch-free polishing of ferrous and non-ferrous metals for metallographic examination. Information is given on proper preparation of specimens and the type of alumina to use under various conditions.

All Steel Pipe Coupling

Burton, Delingpole & Co. Ltd., Old Hill, Staffordshire, is producing a patented "crimp grip" all-steel pipe coupling which may be used to couple pipes and fittings having plain ends, threaded ends, ends beveled for welding or provided with grooves to suit other types of couplings. The couplings require no special tools for application and can be used on thin-walled pipe and fittings. Pipe is securely held against pull-out strain and provides for some misalignment. The uniform circumferential grip does not destroy or damage pipe. Couplings are suitable for either temporary emergency or permanent installations.



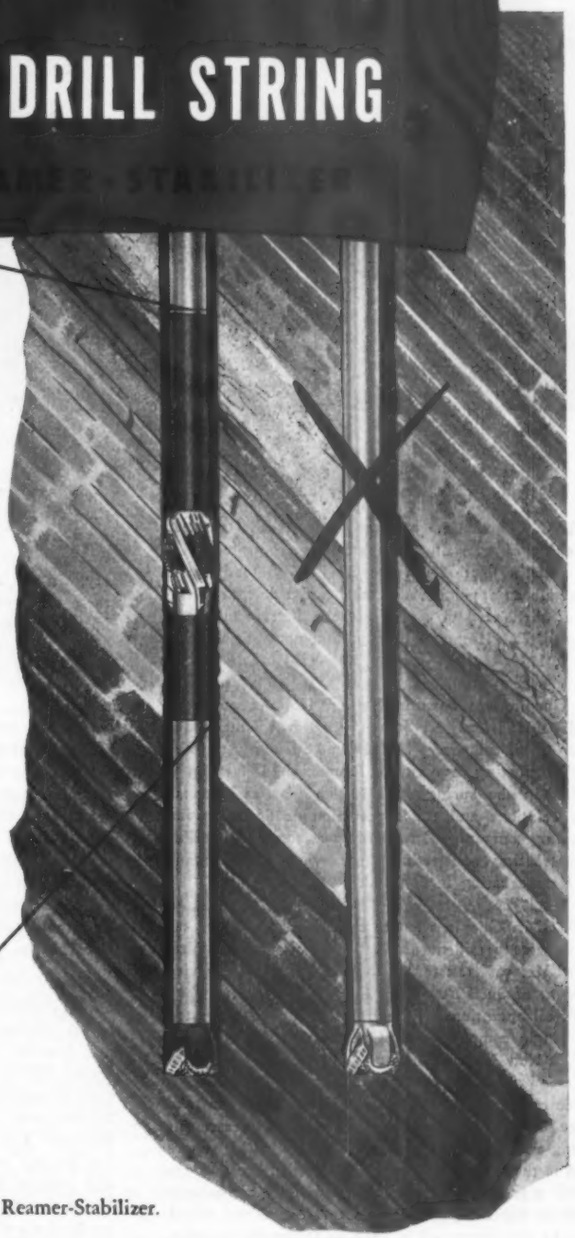
(Please turn to page 92)

Stabilize YOUR DRILL STRING

- INCREASE DRILLING WEIGHTS
- ELIMINATE DRILL PIPE WHIP
- MAKE FULL GAGE HOLE
- ELIMINATE BIT WOBBLE

When the new Security Reamer-Stabilizer is run between drill collars, it not only insures clean full gage hole, but provides unexcelled drill string stabilization. With three barrel-shaped cutters contacting over a third of the wall circumference at all times, this new tool acts as a large roller bearing, absorbing and transmitting to the formation all forces tending to start drill stem whip and rock bit gyration.

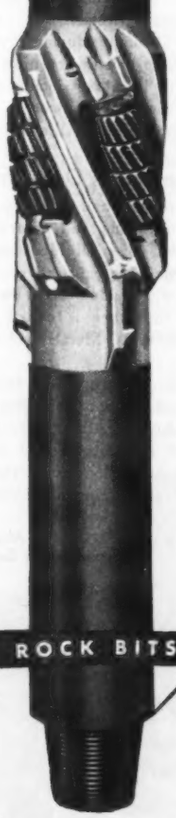
The result of running the Security Reamer-Stabilizer is a smooth drilling string to which weight may be added *without* the usual undesirable effects. Drilling can proceed at a faster rate and the time for the entire drilling operation is reduced appreciably.



LOOK AT THESE FEATURES

- Extra strong body sections throughout.
- Barrel-shaped cutters provide proper bearing surfaces for efficient stabilization.
- Forged steel body heat treated for maximum strength and toughness.
- Cutters retained in body by exclusive locking device.
- Extra long upper shank for easy handling

Ask your Security Field Representative about the Reamer-Stabilizer.



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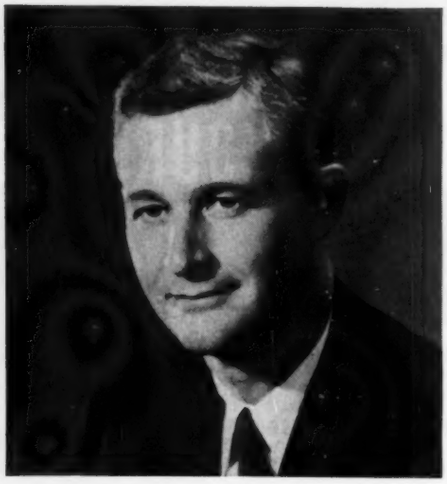
International News and Notes

F. A. C. Guepin



Harry A. Jarvis

New Guepin Appointment

F. A. C. Guepin has been appointed a director and managing director of the Anglo-Saxon Petroleum Co. Ltd. and the Shell Petroleum Co. Ltd. of London. He has also been appointed a member and a delegate member of the board of de Bataafsche Petroleum Maatschappij, The Hague. The appointments were effective Jan. 1, 1950.

Mr. Guepin was born in Helder, Holland and educated at Haarlem. He joined the Royal Dutch/Shell Group of oil companies in 1929 and spent a year with Shell's operating company in Roumania. Returning to London in the spring of 1930, he was assigned to trade relations and the supervision of Scandinavian marketing companies. In 1936 he was made responsible for marketing and refining operations in Germany and for marketing in Holland.

In 1937 Mr. Guepin went to the United States as executive vice president of Shell Oil Co. on the West Coast. He was transferred to St. Louis as senior vice president of Shell Petroleum Corp. and in 1940, when Shell's oil operations in the United States were vested in a single company, Mr. Guepin went to the head office in New York as senior vice president.

He returned to London in the Autumn of 1944 to take charge of the group's North European interests in refining and marketing and in 1949 extended his supervision to the whole of Europe and North Africa. During the war years, Mr. Guepin travelled extensively on official business, and for his services to the Allied cause, he was decorated in 1947 by Queen Wilhelmina with the rank of officer in the Order of Oranje Nassau.

B. C. To Encourage Oil Search

The British Columbia government, which has been subject to much criticism because of its Petroleum and Natural Gas Act, which oil companies complained was too restrictive, has taken steps to amend the act. To encourage the search for oil in British Columbia, the government plans to give oil companies larger lease areas and to curb the previous regulations on crown reserves in proven oil areas.

The new B. C. plan will be similar to the "checkerboard" system now used in Alberta. Instead of 1,280 acres, the new deal will allow oil companies to get leases up to 5,760 acres. The license area before oil is discovered is raised from a maximum of 1,280 to 11,520 acres.

The government also proposes to cut in half from 50 to 25 cents an acre the rental for oil licenses, since the government splits the land with the company after a discovery is made. This is done by imposing crown reserves of an equal acreage alongside a new discovery. In the new bill it is specifically provided that these reserves cannot cover a location in good standing. Royalty for natural gas is established at 15 percent of its gross value at the well head, with a minimum of .75 cent per 1,000 cubic feet.

Return of milder weather after the worst winter in 50 years has brought renewed oil activity to B. C. The oil controller's office in Victoria reports that 9,729,880 acres are now under application and permit in various sections of the province. Two major oil companies, Shell Oil and McColl-Frontenac, have applied for more than two million acres. McColl has applied for seven different locations of 250,000 acres each in the northeastern section of the province near the Alberta boundary, while Shell has applied for 250,000 acres near Fort Nelson.

Other applications for land in the northeastern section of the province have been made by Hudson's Bay Oil and Natural Gas Co., British-American Oil Co. and Union Oil of California. They have applied for a total of more than a million acres. Hudson's Bay seeks 256,000 acres at the northeast border and another 256,000 near Fort Nelson. British-American has applied for 256,000 acres near the confluence of the Fontas and Sikanni Rivers south of the Hudson's Bay area. Union has 256,000 acres near the Alberta border just north of the Osborn River.

Most of the exploration is being made in the Peace River district, but the Gulf Islands of the lower B. C. coast, the Queen Charlotte Islands in the north, and the rich farmland of the Fraser Valley on the lower or southern mainland are also being explored. South Brazeau Oil and Allenbee Petroleums have a drilling rig en route from Calgary to Newton in the Fraser Valley. Royalite Oil and Bralco Ltd. have extended their search to the Gulf Islands.

Applications received by the provincial government for oil permits included at the end of March: McColl-Frontenac Syndicate (Shell Oil Co., Canadian Gulf Oil Co., Socony-Vacuum Exploration Co. and McColl-Frontenac) 1,021,440 acres; Stanolind Oil Co., 250,880; Sun Oil Co., two applications, 512,000; B. C. Pulp and Paper, 15,000; E. M. Kellmer, 30,000; B. I. Nesbit, 179,000; E. Davies, 19,000; E. J. Ryan and S. S. Griffis, 29,490.

Jarvis Appointed To Management Committee

Harry A. Jarvis, who has spent nearly 20 years in the oil industry of South America, has been appointed a member of the management committee of Creole Petroleum Corp., Venezuela. He had been manager of the refinery department of Creole since January 1949 and has been employed by Creole in Venezuela since 1947, when he was named assistant manager of the refinery department. In 1948 he was manager of Creole's Amuay Bay refinery project.

Mr. Jarvis was graduated from the University of Maryland in 1930 and immediately found employment at the Bayway, N. J., refinery of Standard Oil Co. (N. J.) After seven months he was transferred to Argentina as a junior engineer at the Campana refinery of Compania Nativa de Petroleo. He ultimately rose to the position of president and general manager of this company.

Oil Shale Conference

The Second Oil Shale and Cannel Conference, which, like the first conference held in 1938, is being organized by the Institute of Petroleum, will be held at Glasgow July 4-6, 1950. The organizing committee is under the chairmanship of Robert Crichton, managing director of Scottish Oils Ltd. The papers committee is headed by Prof. W. M. Cumming of Royal Technical College, Glasgow. The conference will have three main divisions; geology and mining; retorting, refining and uses of by-products; and economics and statistics. A large number of papers have been promised to date.

As 1950 is the centenary year of the James Young patent which brought into being the Scottish shale oil industry, the conference will open with the James Young Centenary Lecture. This will be delivered by Prof. W. M. Cumming during a reception at the Royal Technical College on the evening of July 3. In addition to the technical sessions, arrangements will be made for a tour of the Scottish shale field and the shale works of Scottish Oils Ltd.

Egyptian Mines Department Divided

Due to the pressure and diversity of its activities, the Department of Mines and Quarries of the Egyptian government has been divided into two separate departments. One is called the Department of Mines for Fuel Affairs, which administers the country's petroleum affairs, and the other is called the Department of Mines for Minerals, Metals and Stones.

Director of the Department of Mines for Fuel Affairs is Dr. Mahmoud Abou Zeid Bey, while the Deputy Director is Mostafa Allam Bey. Dr. Abou Zeid Bey was educated in America and recently returned to Cairo after a professional visit there. Mr. Allam Bey was educated at Birmingham University, England.

Left to right: Mahmoud Abou Zeid Bey, Mostafa Allam Bey.

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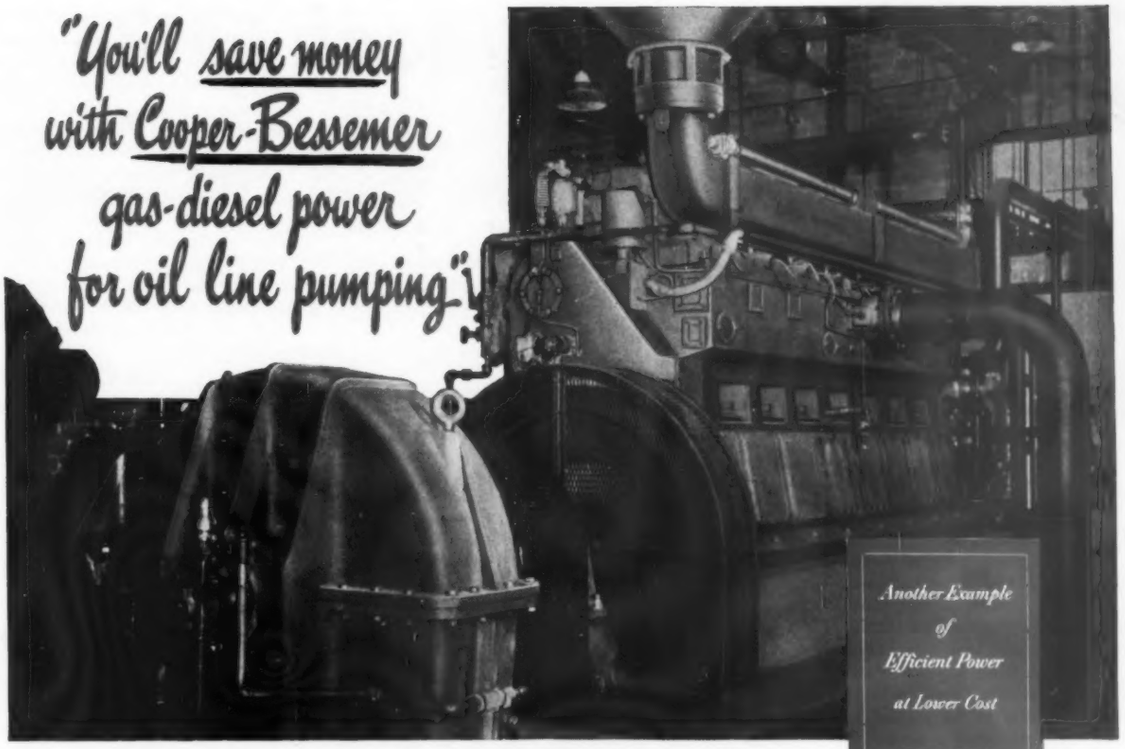

One of the two 690 hp Cooper-Bessemer gas-diesels driving centrifugal pumps in Empire Pipe Line Company's Sour Lake, Texas, station. Typical Cooper-Bessemers, these engines are giving exceptionally economical trouble-free service.

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Cooper-Bessemer gas-diesels are a money-saving "natural" for oil line pumping service. This is evidenced by the performance of two of these modern units in Empire Pipe Line Company's Sour Lake station (shown here). Originally installed as oil-burning diesels during 1946-47, the engines operated with exceptional efficiency and economy, but were later converted to gas-diesel operation.

A view of Empire Pipe Line Company's modern pumping station at Sour Lake, Texas, powered by the two Cooper-Bessemer 690 hp gas-diesels.

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1. Here, as elsewhere, the use of low-cost gas, at full diesel efficiency, has cut fuel cost to a mere fraction of the cost of oil-burning operation. Cooper-Bessemer gas-diesels operate on any gas-oil combination from 5 to 100% oil as influenced by fixed or variable fuel supply.

2. Lube oil consumption is incomparably low. The oil-burning diesels operated a normal 2,340 hp hrs per gallon of lube oil consumed. Gas-diesel operation now actually averages 9,350 hp hrs per gallon. This big saving is also typical.

3. Likewise, the lube oil filters lasted over 3 times as long, indicating less than one-third the lube oil contamination under gas-diesel operation.

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H. A. Grimes

Grimes Named on Creole Committee

H. A. Grimes, a veteran of 28 years in the oil industry, has been appointed a member of the management committee in Venezuela of Creole Petroleum Corp. Mr. Grimes began his career in Venezuela in 1922 as a field engineer with Creole. Since that time almost all of his work has been done in Latin America. From 1922 until 1943 he was stationed with Creole in Venezuela, during which time he rose to the position of manager of the eastern division. After a temporary assignment in New York, Mr. Grimes was transferred to the Talara oil field of the International Petroleum Co. in Peru in 1944. In 1945 he was named general manager of International's operations in that area, a position he held until October 1949.

Vacuum Plans British Refinery

Proposed construction of a complete oil refinery, specializing in high-grade lubricating oils, at Coryton, England, was announced in London by the Vacuum Oil Co. Ltd. The refinery will have a capacity of approximately 20,000 barrels a day and will cost about $30 million. The refinery operations as well as Vacuum's present marketing facilities in the United Kingdom will be merged with the oil storage, blending and packing business conducted at Coryton by Cory Bros. & Co. Ltd., wholly owned subsidiary of Powell Duffryn Ltd.

Socony-Vacuum and Powell Duffryn each will have an equal interest in the company with the board of directors being increased as well as the shares of stock. The new refinery will treat Middle East crude oil primarily, and the resulting products will replace those at present imported from dollar sources. The refinery is expected to go on stream in about 30 months. Before the nationalization of the coal industry in England, Powell Duffryn was the largest coal-mining concern in the United Kingdom. It also has other trading activities and through subsidiary companies has a network of depots overseas and direct trading associations with most countries in the world.

Pemex Appointment

Rafael Gomez, veteran oilman, has been appointed technical assessor of Petroleos Mexicanos. Sr. Gomez began his oil career as waterboy for field workers of Mexican Eagle in Ciudad Madero, Tamaulipas. He held several high office jobs with that and other companies, and at expropriation 12 years ago became a member of the Administrative Council of Mexican Oil and went with Pemex when it was organized. He has held several executive posts with Pemex and served several terms as a Federal Congressman.

Drilling in Venezuela

The following table summarizes the disposition of rigs on new holes (not including workovers) in Venezuela as of April 1. The total of 74 represents a 7.5 percent decrease from January 1950 and a decrease of 46 percent from December 1948, peak month in Venezuela's oil history when 138 rigs were drilling new holes.

Company	Western Fields Exploit'n	Western Fields Explor'n	Eastern Fields Exploit'n	Eastern Fields Explor'n	Total
Shell	14	6	—	—	20
Mene Grande	1	1	13	4	19
Ven Atlantic	—	1	4	3	8
Creole	3	1	3	—	7
Texas-Mercedes	1	—	4	2	7
Phillips	—	—	4	1	5
Socony	—	—	2	3	5
Richmond	—	2	—	—	2
BCO, Ltd	—	1	—	—	1
	—	—	—	—	—
	19	12	30	13	74

With the March completion of RPN-26, Pantepec has suspended operations in the Roble field. Sinclair's Santa Barbara Cretaceous test SB-133 was abandoned as dry in March. Wildcatting will soon be resumed with Guere-1, about five kilometers west of Mene Grande's current successful new field test, Los Mangos-1.

Mene Grande continues to have the most vigorous exploratory drilling program in Venezuela with three new-field wildcats and three new-pool tests under way as the month ended. Texas-Mercedes and Venezuelan Atlantic are both carrying on one-rig slim-hole programs in the areas of the Ruiz and Tucupido fields, respectively. Texas appears to be having some success. Atlantic's program has just started.

Albercan Negotiates Lease Agreement

The Albercan Oil Corp., subsidiary of Pancoastal Oil Co. C.A., has signed a permit with the government of the Province of Saskatchewan. Albercan is the holder of nine permits totalling two billion acres located in the western part of the province. In return for a total expenditure of approximately $2,300,000, the company can hold title to the full two million acres until Nov. 25, 1953. This sum will be paid in installments to the provincial government, but the company will recover 90 percent for development of the properties. The $2,070,000 to be returned by the government will be used for geological and geophysical work and exploratory drilling.

Under existing regulations the company would have to make a minimum investment of $5,250,000 for a like period to hold the entire two million acres, and of this sum approximately $4,200,000 would represent irrecoverable rentals. Under the new agreement the total expenditures of the company for all of its obligations will be $.02875 per acre per annum, and the company has the privilege of releasing acreage at will without incurring any further obligations on any of the acreage released. Albercan will have the right to convert at any time all or any part of its holdings into 21-year leases.

Exploration in Peace River Area

Two more United States oil companies, Stanolind Oil and Gas Co. and McColl Frontenac Oil Co. Ltd., have applied for permission to search for oil on more than 1,500,000 acres in British Columbia. Application of these two companies brings the total provincial acreage under permit and application to 5,244,372. Of this total 3,200,000 acres are issued under permit, while the balance has been applied for.

Both McColl Frontenac and Stanolind applications are for acreage in the Peace River district which adjoins Alberta oil lands. McColl has applied for over a million acres, while Stanolind seeks permit for 500,000 acres. Forty-two Canadian and United States firms have now applied for oil search permits.

Appointed Area Manager

Grant Whitman, veteran of 27 years' experience in Far Eastern oil markets, succeeds Thomas J. Draper who retired on April 1 as area manager at New York for Standard-Vacuum Oil Company's operations in Japan and Korea. First employed in 1923, Mr. Whitman served in petroleum marketing assignments in Japan, Korea, Manchuria, India and Ceylon until 1947, when he undertook a special assignment with the Petroleum Advisory Group for the occupation forces in Japan. He returned to New York late last year as assistant area manager under Mr. Draper. Mr. Draper's retirement comes after 35 years of petroleum marketing in Indonesia, Hong Kong, Japan and New York. He was made area manager at New York for Japan and Korea in October 1945.

Oil Convoy Safe

More than 480,000 gallons of petroleum products from the central Burma oil fields of Chauk & Lanywa arrived safely at Mandalay, reports The Burmah Oil Co. in Rangoon. Over 20 craft were in the convoy, including oil flats, cargo boats, barges, towing tugs and self-propelled "Z" craft. As with the five previous oil shipments to Mandalay since last August, a military escort accompanied the convoy throughout its 100-mile journey up the Irrawaddy River from Chauk.

Shale Oil in Brazil

Large-scale exploitation of several promising oil shale deposits in Brazil offers a partial solution to the persistent fuel shortages which have hampered that country's industrial and economic development. Oil shales and other rocks from which oil can be retorted have been found in 10 Brazilian states, but the chief development work has been done in the Tremembé-Taubaté area deposits, which are in the Paraiba River Valley in the State of Sao Paulo. Other deposits possibly suitable for development are the Marahu or Marahuito shales in the States of Sao Paulo, Parana, Santa Catarina and Gio Grande do Sul.

Oil yields as high as 36.5 gallons per ton of shale were recovered from Tremembé shales assayed in the U. S. Bureau of Mines Laboratories at Laramie, Wyo. Tests showed a recovery of 12.3 gallons per ton of massive shale; 18.6 gallons per ton of semi-paper shale; 36.5 gallons per ton of paper shale; and 21.3 gallons per ton of run-of-mine shale.

Development of the oil shale deposits at Tremembé-Taubaté has been carried on by Companhia Nacional de Oleos Mineraes under control of the Brazilian Government. Logs of drill holes on mining concessions are included in the Bureau report, along with descriptions of mining work at Tremembé and retorting and refining operations at Taubaté.

Carlos J. D'Empaire, S. A., distributor for International trucks at Maracaibo, Venezuela, recently opened a new $240,000 sales and service building under the management of Joe E. Swartz. Attending the opening ceremonies were J. L. Camp, International's director of Latin American Operations and C. E. Stevens, foreign motor truck sales manager.

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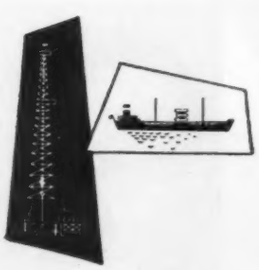

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OIL COMPANY STAFF CHANGES

L. O. Crockett

Eric W. Luster

L. O. CROCKETT, formerly assistant general superintendent of the Gulf Oil Corporation's refineries in Port Arthur, Sweetwater and Fort Worth, has been transferred to the company's general offices at Pittsburgh and appointed manager, technical division of the manufacturing department. He will supervise refinery laboratories and the refinery technology division at Philadelphia and serve as liaison in dealings with the Gulf Research & Development Co. and with the domestic and foreign marketing departments on questions relating to product quality. Mr. Crockett joined Gulf in 1922 as assistant chemist in the experimental laboratory at Port Arthur. In 1934 he was appointed chief chemist for the three Gulf refineries in Texas, and in 1945 he was made assistant general superintendent in charge of refinery laboratories and technology.

FRED A. WALTERS, assistant general manager in charge of manufacturing of the Socony Paint Products Company, Metuchen, N. J., has been promoted to vice president. He succeeds C. G. Nelson who retired Jan. 1. Mr. Walters joined Standard Oil Co. of New York in 1912 in the export department. He was transferred in 1921 to China, remaining there for nine years in charge of the manufacturing and installation department.

LLOYD F. THANHOUSER, Houston, has been elected a vice president of Continental Oil Co. and will also retain his present position as general counsel; R. L. Bosworth, Ponca City, was elected treasurer in addition to being financial vice president of the company; and A. W. Tarkington, former treasurer, Ponca City, was appointed assistant to the president.

Mr. Thanhouser was appointed general counsel of Continental last year. Mr. Bosworth has been with the company for nearly 27 years, having joined as a bookkeeper in 1923. After serving as an accountant, chief accountant and New York office manager, he was elected treasurer in 1942, vice president in 1943 and financial vice president in 1948. Mr. Tarkington joined Continental as treasurer August 1948, after resigning as assistant treasurer of Bethlehem Supply Co.

DONALD B. EDWARDS has been appointed chief engineer of the manufacturing department, Stanolind Oil and Gas Co. He succeeds A. J. Pettigrove, resigned. Formerly chief gas engineer in the manufacturing department, Mr. Edwards joined Stanolind in 1946 as assistant chief gas engineer.

ERIC W. LUSTER has been elected a vice president and director of Standard Oil Development Co. to succeed Dr. N. E. Loomis, retired. Mr. Luster has spent 34 years with Jersey Standard companies. He joined the company in 1916 but was away on military leave for two years during World War I. On his return to the company he spent several years in Italy with an affiliate and returned to the Esso engineering department at Bayway in 1924. He became chief engineer in 1946 and manager of the engineering department in 1949.

N. P. ISENBERGER has resigned as vice president of the American Independent Oil Co., San Francisco. He is returning to the Phillips Petroleum Co. from which he has been on loan.

J. H. OLEHY has been appointed regional manufacturing manager for Continental Oil Co. at Houston, Texas. He will take over his new duties there in July and be succeeded as manager of the company's engineering department by L. W. Vickery. Mr. Olehy joined Continental as assistant refinery engineer in 1927. He successively served as chief process engineer, director of technical services and manager of the engineering department. Mr. Vickery has held positions of growing importance since he joined Continental in 1929 as a draftsman. He became superintendent of the Ponca City refinery in 1948 and regional superintendent a year ago. New director of technical services for Continental is J. S. Hume, a veteran of 25 years' service.

Left to right: J. H. Olehy, L. W. Vickery

ROBERT T. HASLAM, vice president and director of Standard Oil Co. (N. J.) will retire as vice president in the fall and as a director in June. He joined the Jersey Standard organization in 1927, after serving as a consultant while directing the research laboratory of applied chemistry at Massachusetts Institute of Technology. As leader of a group of technicians pioneering in applying chemical engineering to the oil business, he played a major role in the early development of many products and processes which later found wide use in the oil industry.

In 1933 Mr. Haslam was made coordinator of the lubrication sales department of a marketing affiliate and two years later became general sales manager. He resigned as sales manager in 1942 to become a director of Jersey Standard, having as his primary responsibilities sales and public relations. In 1945 he was elected a vice president. In collaboration with R. P. Russell, former president of Standard Oil Development Co., he is author of the book "Fuels and Their Combustion," one of the most widely read scientific volumes of our time. He is also author of many scientific papers and addresses.

SAMUEL B. ECKERT, Sun Oil Co. vice president in charge of marketing, will receive the 1950 Parlin Memorial Award for outstanding contribution to the field of marketing. Presentation will be made at a dinner at the Warwick Hotel on May 16, when he is scheduled to deliver the annual Parlin Memorial Lecture before the Philadelphia chapter of the American Marketing Association.

W. R. BOYD JR., who recently retired as president of the American Petroleum Institute, has opened a law office at Teague, Texas, for consulting practice only. He will be available to a limited number of clients on oil industry matters.

ROY L. LAY has been appointed manager of the geophysical division of The Texas Co., and L. A. Scholl Jr. has been made a geophysical consultant on the staff of E. R. Filley, general manager of Texaco's producing department. Mr. Lay joined Texas as a party chief in 1932 and later supervised a geophysical party in Egypt. He become assistant division manager in 1945. Mr. Scholl joined Texaco in 1916. He was made Tulsa division geologist in 1918 and chief geologist in 1920. He spent five years in Venezuela in the 20's and has served as chief of the Houston geophysical division and manager of the division in recent years.

J. M. JONES has been appointed superintendent of the Lake Charles, La., refinery of Continental Oil Co. He succeeds H. R. Wall who was transferred to Ponca City as assistant superintendent in charge of lubricating and light oil divisions. Mr. Jones joined Continental at Baltimore in 1926 and became superintendent there in 1946. Mr. Wall joined the company at Denver in 1935, spent some time in Ponca City and was transferred to Lake Charles in 1942.

Left to right: H. R. Wall, J. M. Jones

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Warren L. Smith Heads Kellogg

Warren L. Smith, former senior vice president, has been elected president of The M. W. Kellogg Co., succeeding Harold R. Austin who is retiring. The executive staff was enlarged with Bennett Archambault, former treasurer, being elected vice president and general manager, a newly created post. The board of directors also named G. Franklin Bayes, Ronald B. Smith and Zary A. Toula vice presidents. Incumbent vice presidents Dr. William E. Hanford, Alexander Kidd and Frank Liebrecht were re-elected. Daniel J. Olsen was elected treasurer and comptroller and Edwin L. Gidley secretary.

In retiring Mr. Austin leaves an association formed 47 years ago when he joined Kellogg as an engineer-salesman during its earliest days. He was elected president in 1944. Mr. Austin will continue to serve the company as a consultant to the president.

Kellogg's new president is a well-known chemical engineer who has been with the company since 1937. Elected a vice president of the Canadian Kellogg Co., Ltd. in 1939, he subsequently became vice president of the parent company in 1943. Three years later he assumed complete charge of the company's commercial activities. Today Mr. Smith takes over management of a world-wide organization with more than a score of major construction projects underway in the United States, Canada, the British Isles, Belgium, France and South America.

Mr. Archambault, new vice president and general manager, joined M. W. Kellogg in 1945 after outstanding wartime service as head of the London office of the United States Government's Office of Scientific Research and Development. Mr. Bayes has been actively engaged in the construction phase of Kellogg activities for 30 years. He was named director of construction in 1944. Highlight of his career came during the war when, in a span of a little more than three years, he directed the construction of 50 major refinery and chemical projects. Mr. Ronald Smith, who joined Kellogg in 1948 as director of engineering, is a consultant to the Atomic Energy Commission and a member of the National Advisory Committee for Aeronautics. Mr. Toula, prominent as a chemical engineering consultant throughout Europe, has been associated with Kellogg for more than 20 years. With headquarters in Paris, he will guide Kellogg's Eastern Hemisphere commercial activities.

JOSEPH H. MADER has been appointed assistant director of the department of information of the American Petroleum Institute. He has been district representative for the Oil Industry Information Committee in the Middle Atlantic district for the past three years with headquarters in Philadelphia. Ernest E. Robinson, formerly director of public relations and personnel for the Don Allen Organization in Buffalo, N. Y., succeeds Mr. Mader at Philadelphia.

R. G. TEN EYCK, assistant division geologist for Continental Oil Co. at Los Angeles, has been transferred to Houston as assistant to the chief geologist. J. B. Anderson has been promoted to assistant Pacific Coast division geologist at Los Angeles.

OLEN LANE, regional land superintendent for Continental Oil Co. on the Pacific Coast has been appointed regional manager of exploration. Lawrence E. Graham has been promoted to regional land superintendent at Los Angeles.

A. P. KRAMER has been made superintendent of Great Lakes Pipe Line Co., Kansas City, Mo. He will take over part of the responsibilities of J. B. Lawson, who has been vice president and general superintendent. Mr. Kramer was assistant superintendent and prior to that supervisor of the northern area stations. Great Lakes now is engaged in a $55 million expansion program to double capacity of the system from Oklahoma and Kansas refineries to 14 terminals in north central states.

T. B. WELSH, formerly assistant manager of Gulf Oil Corporation's specialty department, has been appointed sales manager, specialties. He is succeeded by R. L. Chambers. In his new capacity Mr. Welsh will direct the sales of specialty products and will cooperate with the Gulf research laboratories in the development and testing of insecticides, household lubricants and similar products.

A. J. HARTMAN has been appointed assistant general manager of employee relations, G. L. Scott manager of the personnel division of employee relations, and W. B. Billock manager of the labor relations division of employee relations for the Gulf Oil Corp. All three men are stationed in the company's general offices at Pittsburgh.

JOHN M. STEVENSON of Bartlesville, Okla., has resigned from Phillips Petroleum Co. to join the Youngstown Sheet and Tube Co. as a development engineer in its mill research and development department. For the present he will be located in the company's Tulsa office but later will be located in Dallas, Texas. For the time being he will concern himself principally with pipeline problems.

LEE R. COWLES, traffic manager for Standard Oil Co. of Indiana, has been elected president of the Traffic Club of Chicago. He is the first oil man to be so honored. Mr. Cowles has been engaged in oil traffic works since 1922 when he became first traffic manager for Lion Oil Refining Co. at El Dorado, Ark. Previously he had spent 11 years in railroad work. He joined the Standard of Indiana traffic department in 1937.

COLONEL HARRY T. KLEIN, president of The Texas Co. was granted the honorary degree of Doctor of Commercial Science by New York University on April 11. The presentation of the honorary doctorate to Col. Klein and 49 other business and financial leaders climaxed a two-day conference marking the fiftieth anniversary of New York University's School of Commerce, Accounts and Finance.

ROBERT H. STEWART of Hollis, N. Y., has joined the headquarters staff of the American Petroleum Institute as administrative assistant to the president. Mr. Stewart came to the API from the California Texas Oil Co. Ltd., where he had been assistant to the vice president in charge of marketing.

T. A. Ramey Joins Ideco

T. A. Ramey, formerly sales manager for the Unit Rig & Equipment Co., has joined the International Derrick and Equipment Co. as general manager of domestic sales of the M & E division. Mr. Ramey has had 16 years' experience in oil field equipment sales engineering, having spent 13 years with National Supply Co. before joining Unit Rig in 1947.

T. A. Ramey

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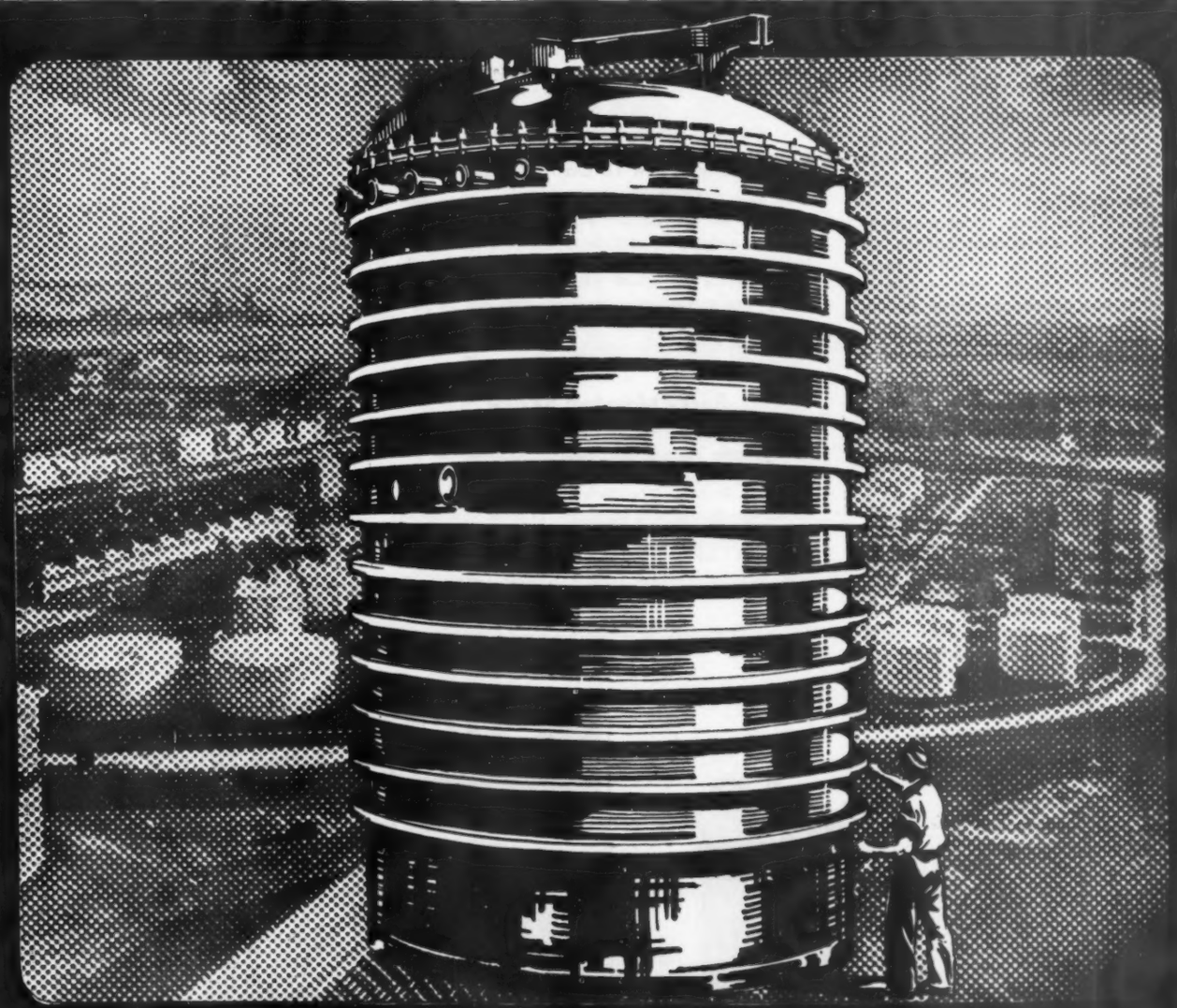

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Left to right: Jack E. McKay, James G. DeFlon, Lee Weidlien

Fluor Advances DeFlon, Weidlien and McKay

The Fluor Corp. Ltd. has promoted three of its personnel. James G. DeFlon, engineer with Fluor since 1941, has been assigned to the New York sales office following his return upon completing details of the company's agreement with Head Wrightson Processes Ltd. in London. The agreement between the two companies paves the way for the sale of Fluor products and services in the sterling and other European areas. Mr. DeFlon reports that Fluor cooling tower jobs are already under way for British Petroleum Chemicals in Grangemouth, Scotland; for Philblack Ltd. at Avonmouth, England; and for Socony-Vacuum at Gravenchon, near Le Havre, France.

Lee Weidlien, engineer for Fluor in their Los Angeles sales office from 1943 to 1948, recently rejoined the company to take charge of sales in Fluor's San Francisco office. Jack E. McKay, advertising manager at Los Angeles, was appointed sales engineer in the Houston sales office. Prior to his position as manager of advertising and public relations, he worked as a sales engineer in Kansas City and Los Angeles.

To Build Gasoline Plant In Elk City Field

A large-scale gasoline plant will be built by Shell Oil Co. in the Elk City field, located in Beckham and Washita Counties, Okla., by Refinery Maintenance Co., Houston. Capacity will be 100 million cubic feet of gas daily. The plant is designed to permit the adoption of facilities to provide cycling, repressuring and crude stabilization if a unitization plan is developed.

API Production Division Moves

The division of production of the American Petroleum Institute moved into larger quarters March 31. The new address is 816 Rio Grande National Building, Dallas 2, Texas. The old address was 1205 Continental Building, Dallas.

New "How To Do" Manuals

Two more "How To Do" manuals have been published by the Oil Industry Information Committee to help the nation's oil men carry the story of the petroleum industry to the public. The new publications are a speaker's handbook and a manual on how to set up and operate essay contests. Previous publications include a press and radio handbook, an "open house" handbook and a community leader handbook.

Rocky Mountain Review

Petroleum Information Inc., Rocky Mountain oil and gas reporting service, has published its twentieth annual Resume of Oil and Gas Operations in the Rocky Mountain Region. The book contains 185 pages of maps, statistical reports and general review of Rocky Mountain activities during 1949, including reports of leasing and geophysical activities. Copies of the book may be obtained from Petroleum Information, Continental Oil Building, Denver, for $10.

John Thomas O'Neil

John Thomas O'Neil died at Los Angeles March 25 after a heart attack. Mr. O'Neil was an independent oil operator in the Southwest, the Rocky Mountain region and on the West Coast with a brother, Louis B. (Tip) O'Neil. At various times he was identified with the International Refining Co., Kevin-Sunburst, Mont., the Wellington Oil Co. in Texas and California, the Santa Clara Oil Co. in Texas and the Far West Oil Co. in Texas and Wyoming.

Mr. O'Neil's philanthropies covered a wide field. He was Texas representative of the Society for the propagation of the faith of the Catholic Church, handling all their fee lands in the state, and a knight of Malta.

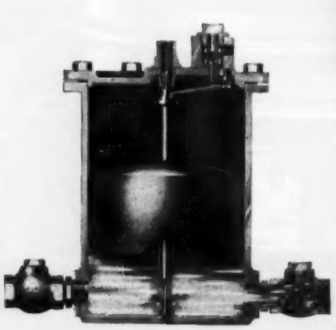
Automatic Vent and Drain Valve

By using a simplified ball-type seating mechanism instead of the customary disc, Crane Co. has improved its automatic vent and drain valve to assure more accurate seating and longer life. The valve is easy to install in water or oil piping systems to remove entrapped air, or in compressed air systems to remove water and oil. Sizes are available to take care of air requirements up to 150 psi and water up to 125 psi.

Carl Joys Rejoins A. O. Smith

Carl Joys Jr., who was connected with the A. O. Smith Corp. for many years as a sales executive, has rejoined the firm as an assistant to the president. Mr. Joys has long been associated with the petroleum and oil refinery industries, and his new duties with A. O. Smith will center primarily in this field. Mr. Joys originally joined A. O. Smith in 1924. He left the company in 1939 to establish his own sales company. He later became sales executive of the plate and welding division of the General American Transportation Corp.

This patent



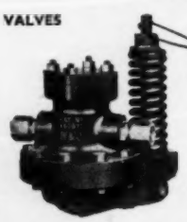
AUTOMATIC PUMP

combines the good qualities of a pressure pump and a vacuum trap. Pumps condensate from low-pressure or vacuum vessels and lifts up to fifty feet; pumps boiling, cold or gaseous fluids (including oils); pumps petrol, benzine, dye liquors and alkaline liquors such as caustic, ammonia, etc.; drains sump holes, pits, excavations (where it may be fully submerged). ENTIRELY AUTOMATIC. *Details of "Ogden's Patent Pump" (in five sizes) from:* OGDEN & CUNLIFFE, (Petroleum Dept.) Charlton House, Cheltenham, Glos., Eng.

WILLIAMS & JAMES
(ENGINEERS) LIMITED
GLOUCESTER ENGLAND

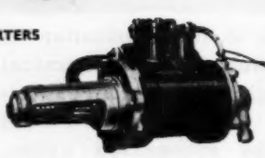
LONDON OFFICE: 4 NEW COURT, LINCOLN'S INN, LONDON W.C.2 TEL. HOLBORN 4635

VALVES



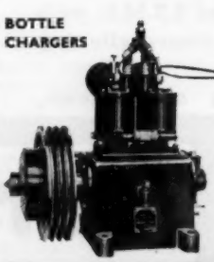
Designed by experts to give a minimum sympathetic pressure drop with variations of upstream pressure. Maximum flow with minimum working drop and absence of pressure creep with no flow. Leaflet No. 43 gives full details.

STARTERS



Air Starting Motors for Compression Ignition Engines and Gas Turbines. Robust, reliable, easy to install and economical in operation. For use with engines from 20-BHP to 750-BHP. Fire risk eliminated. Leaflet No. 32 gives full details.

BOTTLE CHARGERS



Single-stage, heavy duty Bottle-charging Air Compressors for pressures up to 450-lbs p.s.i. Displacement range 2.4—8.7 c.f.m. Machined from finest materials to interchangeable limits. Multi-stage Compressors up to 30 c.f.m. Leaflet No. 41 gives full details.

Technical advice on pneumatic problems gladly given on request

SPECIALISTS IN COMPRESSED AIR EQUIPMENT & HIGH PRESSURE RAM PUMPS

LEE C. Moore SuperKAY DERRICKS

IT TAKES
BIG DERRICKS
TO DRILL
THE
WORLD'S
DEEPEST
WELLS

This Big SuperKAY Derrick on the world's largest rig, is 192 feet from base to top plate, measured up the leg. It is designed for drilling beyond 20,000 feet, and proved itself in operations which produced the world's deepest hole. For deeper well drilling, specify Lee C. Moore SuperKAY Derricks.

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CONTRIBUTIONS OF REFINING INDUSTRY TO FRENCH NATIONAL ECONOMY

(Continued from Page 57)

and after the devaluation of the franc is fully due to the world market prices alteration which occurred at the same time. It seems, therefore, that the franc devaluation had practically no effect on the currencies saving process, owing to the crude oil refining in France.

It may be calculated that the average currency saving in the fourth quarter of 1949 was 55 cents per barrel. On this basis the total currency saving to France in 1949 was $35,209,450. Such a saving of currencies represents the huge profit which France may presently draw from the existence on its national soil of a powerful refining industry which meets in general outline the chief needs of consumers of petroleum products. It was possible to calculate this advantage and to put it into figures, but it is only a part of all advantages brought by the French refining industry to the French economy as a whole. The other numerical proofs apt to be given are beyond the limits of this study, and we will only briefly mention the most important of these advantages.

From a political point of view, the possibilities of obtaining a regular supply of petroleum products is, for a modern state, one of the most important factors ensuring its political independence. Crude oil refining on national soil, replacing imports, minimizes the risks of a possible shortage on the world market, even in the event of a new world conflict. The national refining industry, as presently organized, is able to meet the chief needs of finished petroleum products in France with a maximum of independence compatible with the present conditions of the general political and economical situation and with the possibilities of crude oil supply.

The petroleum policy followed since the end of World War I enables France to secure its crude oil supply satisfactorily. The outlook of the research undertaken in France and in its overseas territories gives France the hope of founding, on its national soil and in the Union Française, new sources able to improve considerably the conditions of its crude oil supply.

From an economic and industrial point of view, the petroleum refining industry is an important consumer of numerous industrial products and a supplier of several industrial raw materials difficult or impossible to secure elsewhere. The industry is important because certain raw materials utilized in the chemical industry may be extracted from the secondary products of petroleum refining, such as, for instance, naphthenic acids and their salts utilized in the paint and varnish industry, and in the textile industry, as emulsifiers, detergents or fiber protection agents. Gaseous and liquid fractions obtained in the crude oil treatment may be used as raw materials for the manufacturing of numerous industrial products, such as carbon black, butadiene (rubber), hydrogen (ammonia synthesis), ethylene, propylene, acetylene, aldehydes, ketones, acids, methyl and ethyl chlorides, chloroform, carbon tetrachloride, and other solvents and insecticides.

From a technical and social point of view the refining industry has increased employment of skilled labor. Employment at the end of 1949 was as follows:

Engineers and assimilates	450
Mastership agents	860
Specialized employees	1,560
Skilled and highly skilled workmen	4,510
Specialized workmen	2,090
Unskilled and manual laborers	2,200
Total	11,670

The French petroleum industry as a whole employs more than 38,000 manual and intellectual workers, as follows:

	Skilled	Unskilled	Total
Refining	9,470	2,220	11,670
Distribution	26,200	9,000	35,200
Exploration & drilling (including overseas territories)	3,000	4,500	7,500
Total	38,670	15,700	54,370

The Institut Français du Pétrole in the sphere of studies and scientific research has contributed much to the nation. This organization, which actually controls the institutions of technical education such as Ecole Nationale Supérieure du Pétrole et Combustibles Liquides, Ecole Nationale des Moteurs, Ecole de Maîtrise, has realized in its scientific research an undertaking of wide scope in each branch of petroleum industry. These institutions include laboratories for geological and geophysical studies, control laboratories for testing products and the national research station for studies of both new methods of production and utilization.

H. J. Polk

Creole Promotes Polk

H. J. (Jack) Polk has been appointed assistant manager of the western division of Creole Petroleum Corp., with headquarters in Maracaibo. At 48, Mr. Polk has had nearly 25 years' experience in the oil business. Graduating from the U. S. Naval Academy at Annapolis in 1925, he went to work that year with Simms Petroleum Corp., Dallas, and rose to the post of chief engineer with that company. He was with Humble in Baytown from 1928 to 1935 and then moved to Aruba as assistant mechanical superintendent of Lago's refinery there. From 1943 to 1945 he served with the U. S. Army.

He came to Creole in Venezuela in 1946, when he was manager of the refinery project just then getting under way at Amuay Bay on the Paraguaná Peninsula. In January 1949 he was transferred to the Caracas headquarters of Creole as engineering assistant to the refinery department.

Joins Petroleum Technologists

Roy Hitchcock has been appointed vice president in charge of sales for Petroleum Technologists Inc., Montebello, Calif. He formerly was owner of H. & B. Sales Co. (now Power Rig and Equipment Co.), Pacific Coast representative for Wilson Manufacturing Co., but in 1943 he entered the Navy and sold his business.

New Exploration in Peru

In the Sechura district, principal oil prospect on the Pacific coast of Peru, a permit for geological and geophysical studies has been granted by the Peruvian government to Robert H. Ray of Texas as representative of the Conorada Corporation. Arthur A. Curtice, president of Conorada, recently visited Peru and a magnetometer survey of the Sechura area is proposed by his company. The permit does not include any concessionary rights which can be granted only after the enactment of the new oil law, but it is reported that the government has in mind to divide this huge area of 2,240,000 hectares among several different companies.

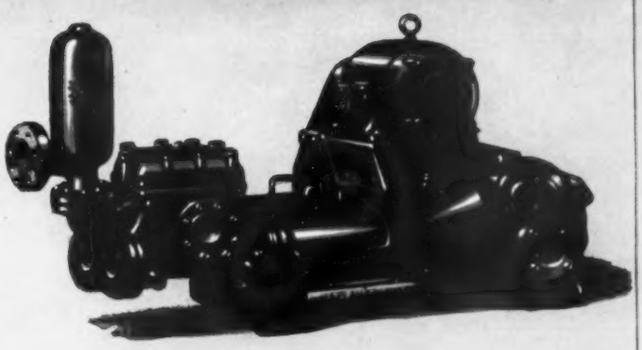
Babin to Manage Amuay Bay Plant

Chester L. Babin has been named manager of Creole Petroleum's newly-opened refinery at Amuay Bay, Venezuela. He has been assistant manager of Creole's western division since November 1945. Mr. Babin entered the oil industry 31 years ago as a roustabout for Standard of Louisiana in 1919. He joined Tropical Oil Co. in Colombia in 1926 and has stayed in South America ever since. He has been with Creole since 1933.

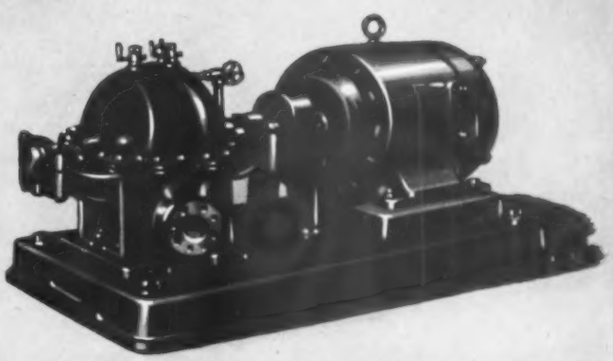
Chester L. Babin

PUMPS

for the Oil Industry

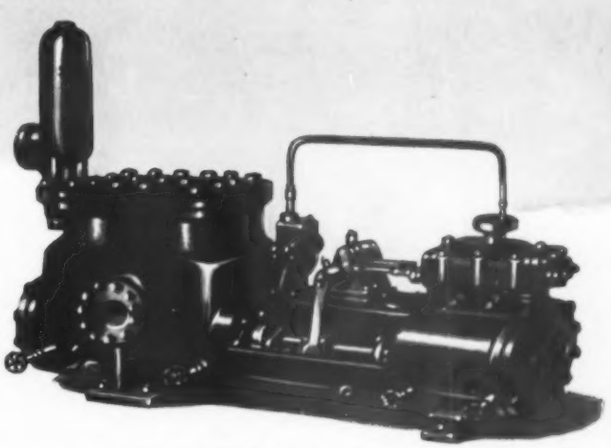


TOTALLY ENCLOSED DUPLEX PUMP for motor or engine drive by gearing, vee ropes or flat belts. A fabricated steel skid type base plate can be supplied if desired. The pump end can be fitted with liners, pistons, valves, etc., to suit any service requirement.



2 STAGE MEDIUM LIFT VOLUTE TYPE PUMP. Made in sizes from 2" to 6" delivery branch for heads up to 250 ft. Normally supplied with cast iron casing and bronze internal parts but special materials can be supplied if desired. For direct or belt drive.

MULTI-STAGE MOTOR DRIVEN PUMPS made in a range of sizes up to 6" diameter delivery branch, with from one to ten stages, suitable for heads up to 1000 ft. Cast iron casings and bronze internal parts. Can be supplied for higher pressures with cast steel casings.



A typical Evans **DUPLEX STEAM PUMP.** Built for extreme service. Can be fitted with removable liners of material to suit all requirements and valve service to suit varying liquids. Simplex steam pumps and steam jacketed pumps on similar lines are also made in a range of sizes.

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Oil Drain Film

Petroleum Educational Institute, Los Angeles, has completed production of an educational strip film in support of 1,000-mile drains of crankcase oil. The film explains various factors affecting drain periods and stresses cost of maintenance as a reason for 1,000-mile drains.

Hydraulic Pressure Testing Intensifier

A simple setup for static pressure testing of boilers, piping systems, compressor cylinders and similar pressure vessels is now being made possible by a new, unique air-operated hydraulic pressure generating device. Developing up to 23,000 pounds per square inch, the new device known as the Cooper-Bessemer intensifier is suitable also for many types of laboratory destruction tests where extremely high pressures are involved. Compact in design, it weighs only 80 pounds and is mounted on a two-wheel rubber tired under-carriage for easy portability in any testing job. The operation of the unit requires only the connecting of the intensifier to any ordinary compressed air line.

In operation, the intensifier draws oil from its built-in supply reservoir. Variable static hydraulic pressures are preset by a simple turn of the intensifier's regulator valve that is equipped with a dial-type air pressure gauge. Discharge pressures are visibly indicated on a large direct reading dial gauge. Any static pressure up to 23,000 pounds per square inch can be quickly built up by using air line pressures up to 90 pounds per square inch. The Cooper-Bessemer Corp., Mount Vernon, Ohio, has published a free bulletin, now available, giving complete details.

Opens West Texas Office

Establishment of a west Texas-New Mexico division office of Southern Geophysical Co. in Midland, Texas, has been announced by Dr. Sidon Harris, president of the company. R. E. Davis and Elmer F. Blake are supervisors in charge of the office. Eleven seismograph field parties are now being operated by Southern Geophysical Co. in the southwest, and since the establishment of this company in 1945 there have been 17 commercial producing oil fields discovered following surveys made by Southern crews. Working closely with the staff at Midland and all Southern crews is a central office of seismologists, computers and draftsmen in the Fort Worth headquarters of Southern Geophysical Company.

Plans School Program

A special study of secondary schools, both public and private, is being made by the Oil Industry Information Committee to determine the most practicable method of setting up a program to cooperate with the schools. Pendray & Leibert, New York public relations consultants, will report results of a study at the May meeting of the committee in Chicago. Purpose of the school program is to make current information, such as films and booklets, available to educators and students alike to help them reach a better understanding of the oil industry, its operations and achievements, and simultaneously to give the oil men a clearer picture of the schools.

Mary Sudik No. 1 Logged

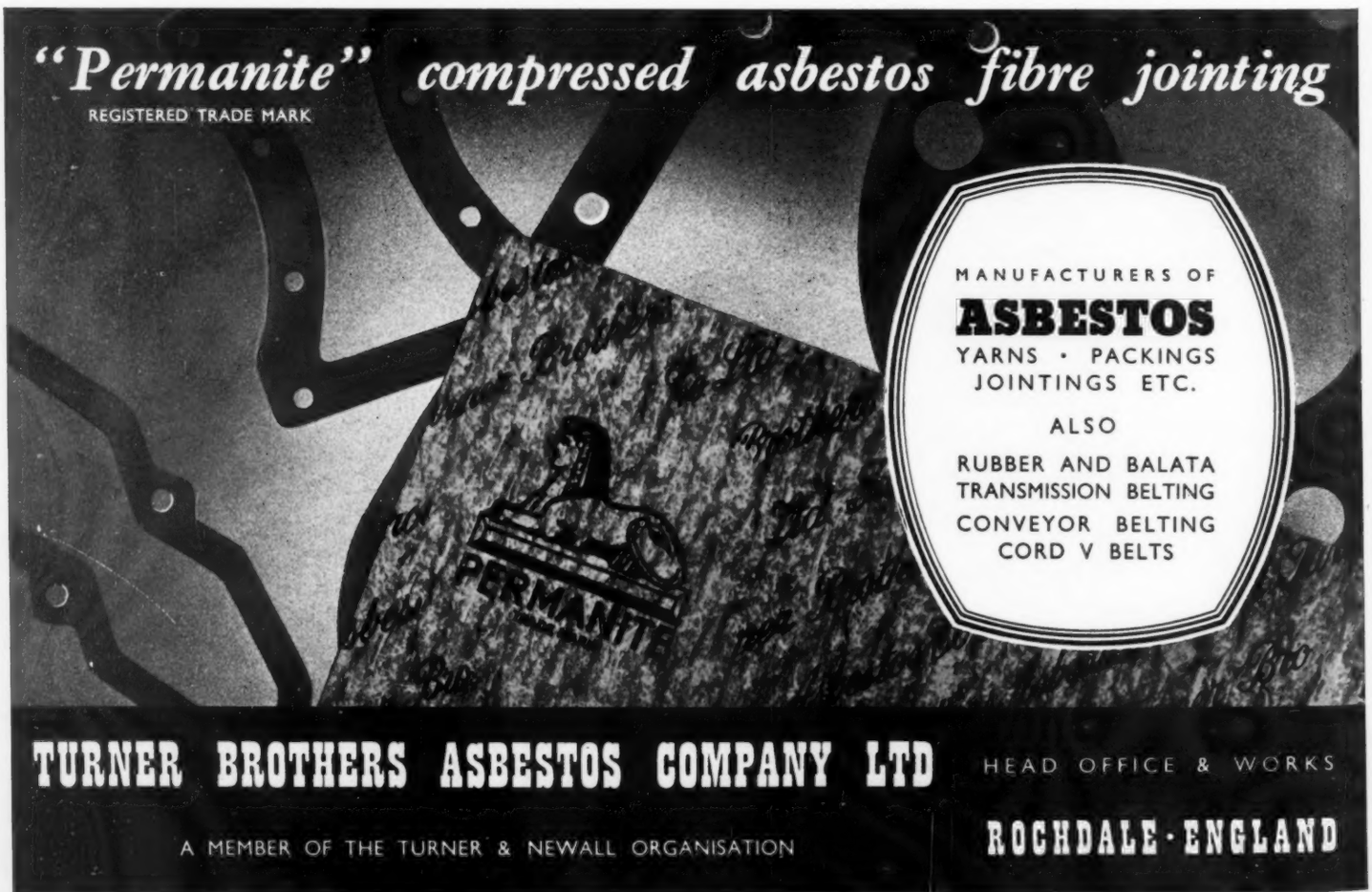
Mary Sudik No. 1, famous 20 years ago as "Wild Mary Sudik" was recently the scene of the 25,000th radioactive well logging of Lane-Wells Co. Mary Sudik No. 1, one of the early wells in the Oklahoma City field went out of control and created a capping job of unusual difficulty because of the large amount of sand being produced with the oil. It is said that among the claims produced by the operation were several from co-eds at the University of Oklahoma some 18 miles away who asserted that their lingerie was spotted with oil when they hung it on the line. After being controlled, the well produced 800,000 barrels of oil, flowing until January 1936. When the radioactive log was run on March 24, officials of Cities Service Oil Co. and of Lane-Wells and Well Surveys, Inc. were present.

Karl O. Lellky

Karl Ola Lellky, assistant director of public relations of Baroid Sales Division, National Lead Co., died in Houston March 6. Mr. Lellky was born in Boras, Sweden, in 1905 and had been with Baroid since Jan 1, 1948.

Moves Department to Tulsa

Deep Rock Oil Corp. has transferred its supply and transportation functions from Chicago to Tulsa, according to J. G. Campbell, supplies and economics division manager. L. B. Rada of Chicago, formerly assistant manager of the traffic department, has been named manager to succeed H. R. Gillespie of Chicago, who is retiring. A. R. Gockel of Tulsa, who has been assistant to Mr. Campbell, has been appointed manager of the product supply department, succeeding R. J. Gaden of Chicago, transferred to the marketing division.



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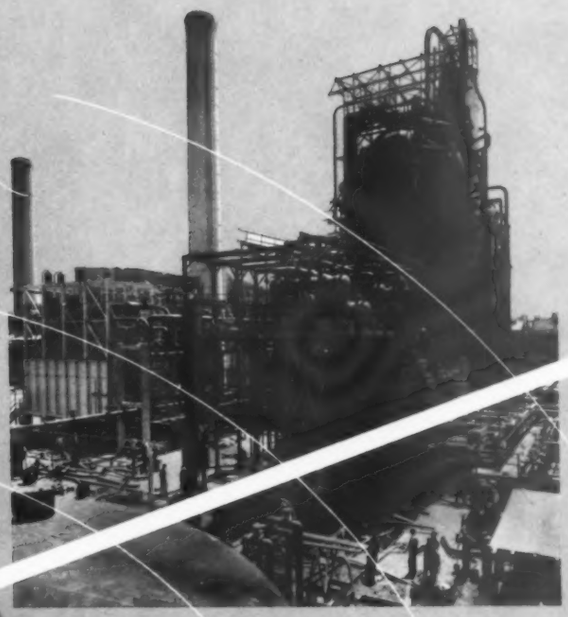

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active liaison between the Refiner and Foster Wheeler in the office, shop and field; . . .

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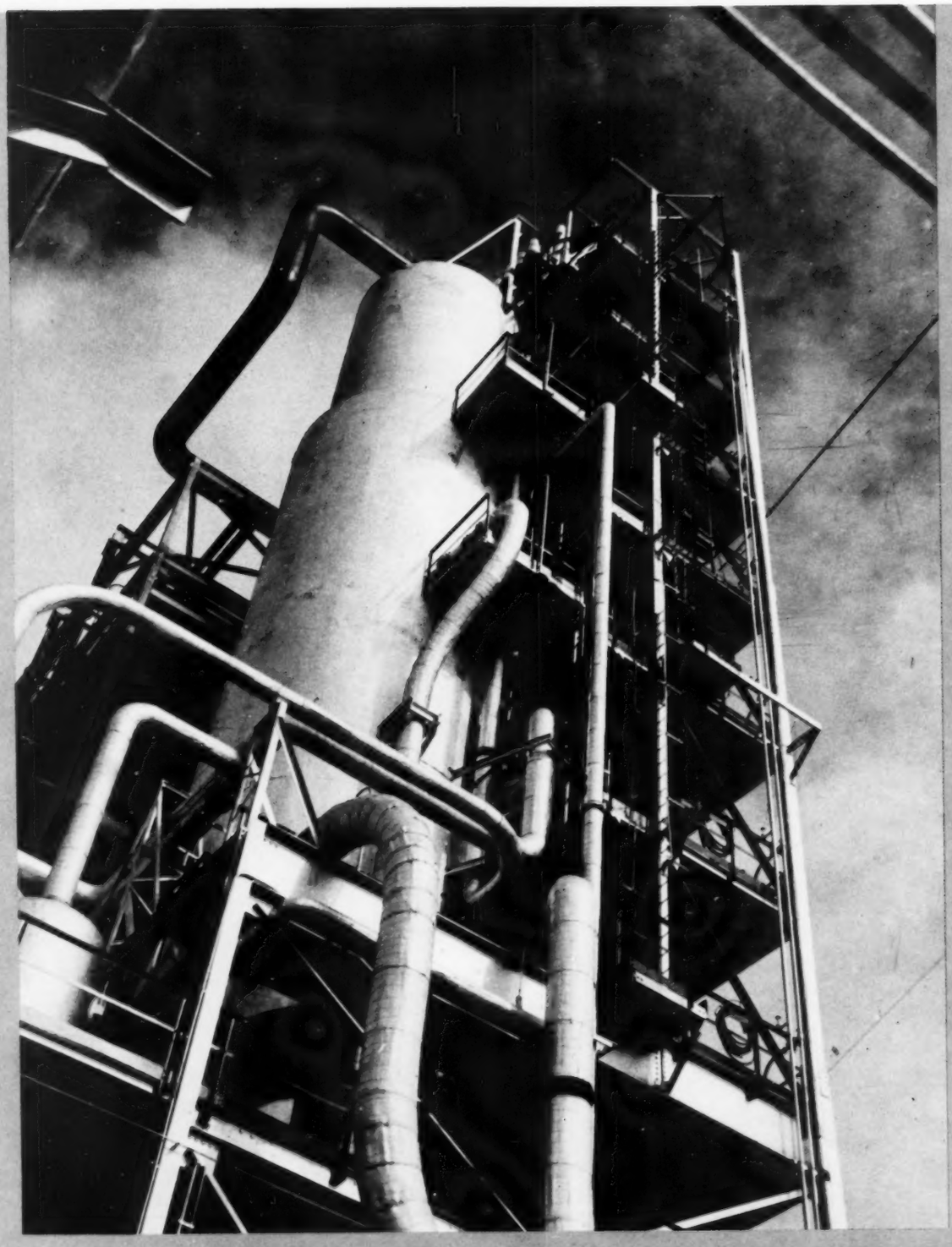

63,000 bbls/day

A top-of-column view of the 63,000 bbl/day Crude Distillation Unit engineered and constructed by Foster Wheeler for the Creole Petroleum Corporation at Amway Bay, Venezuela.

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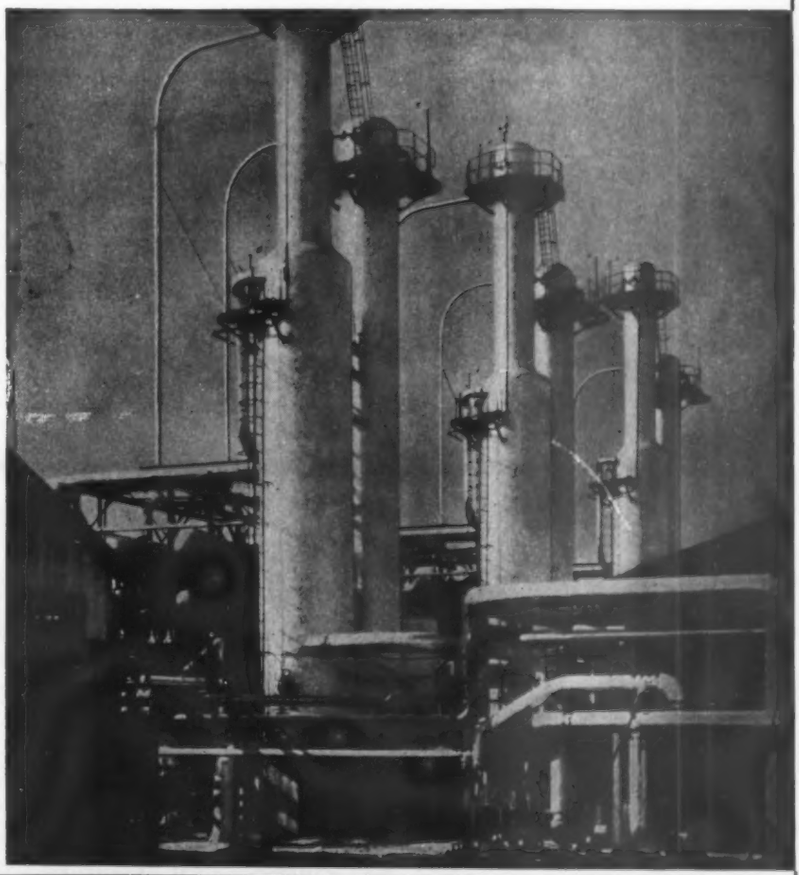

NEWALLS REGD BRAND PRODUCTS

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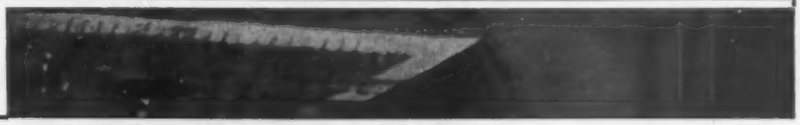

Paul Truesdell

PAUL TRUESDELL has retired from the Universal Oil Products Co., Chicago, after more than 20 years as a member of the advertising and public relations staff. Mr. Truesdell has rounded out a 42-year career in journalism. In 1917 he went with National Petroleum News and joined Universal in 1929. Paul and Mrs. Truesdell will make their new home in Napoleon, Ohio.

Donald G. Clark

Donald G. Clark, 62, director of purchases for the Gulf Oil Corp. from 1939 until his retirement last June, died at his home at West Dennis, Mass., on April 8. Mr. Clark was loaned to the government for service in connection with the U. S. preparedness program in 1941 and was assistant director of purchases, working with Donald M. Nelson, until illness forced his resignation seven months later.

Chile Proposes New Government Enterprise

The Chilean government has submitted to Congress a proposed law, creating an autonomous enterprise for the development, refining and marketing of Chilean oil from the Magellan fields. Capital is to be provided entirely by the government's Corporacion de Fomento, excluding any private association.

The government recently bought in the United States a tanker of 100,000-barrel capacity at a reported price of $1,200,000.

Asks More Acreage

Netherlands Petroleum Co., a Shell subsidiary, is seeking to enlarge its Kroonenberg concession in Dutch Guiana from 40,000 to 240,000 acres. Exploratory work has suggested to the company that a field may be developed which will have a much greater extent than the area covered by the original concession.

Canadian Survey of Oils

The Financial Post, Toronto, has published its Survey of Oils, 1950 edition. The 224-page book lists 2,500 companies in Canada including those now inactive or defunct. Financial and property details are given for more than 500 companies now operating in Western Canada. Lease maps of Alberta and Saskatchewan and detailed maps of the principal Prairie Province fields are published. Price of the volume is $1 from Maclean-Hunter Publishing Co. Ltd., 481 University Ave., Toronto 2, Canada.

Argentine Film at Nomads Meeting

A colored moving picture of oil operations in Argentina as well as scenic shots of the back country was shown at the Los Angeles Nomads March meeting. S. W. Webster of the Dallas office of Emsco Derrick & Equipment Co. introduced the film, which he took on his recent trip, and enlivened its showing with a humorous running account of his experiences.

John Van Norden

John Van Norden, secretary and sales promotion manager of American Meter Co. Inc., died March 17 at New York Hospital. He was a member of the executive board and the executive committee of the American Gas Association; treasurer and director of Gas Appliance Manufacturers Association Inc.; a founder-member of the Society of Gas Operators and clerk of the Gild of Ancient Supplers.

WILLIAM R. MARSHALL, general manager of The Atlantic Oil Storage Co., Antwerp, has been made a Knight of the Order of Leopold I in recognition of services rendered to the Belgian economy. The Atlantic Oil Storage Co. is the marketing subsidiary in Belgium of Atlantic Refining Co. Mr. Marshall has been stationed in Europe for a number of years.

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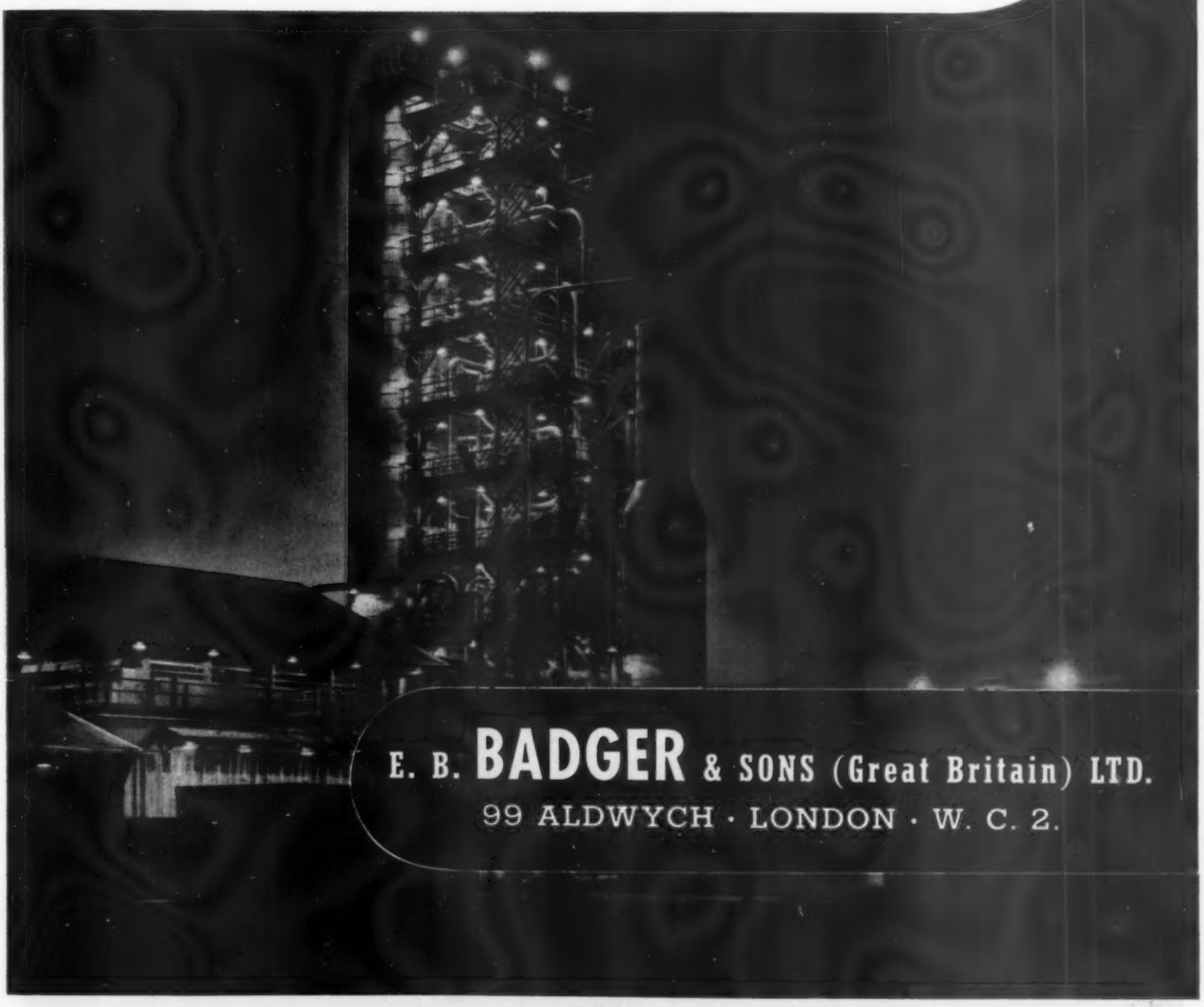
This example of Badger's current work in the Sterling area is the largest post-war refining unit in Europe yet to be completed and brought into successful operation.

Badger's British and American companies together designed, procured and installed this 40,000 BPSD crude distillation unit at the Llandarcy Refinery of National Oil Refineries Ltd., for Anglo-Iranian Oil Company Ltd. Practically all of the materials were of British manufacture.

Here is an example of Badger at work in the international scene. Our British Company is well established and its activities integrated with those of the American parent. Relative dollar and sterling effort and equipment can be proportioned to suit respective currency availability, and this arrangement can be extended to provide for other currencies as well.

The establishment of our British Company twelve years ago, which in itself has executed contracts totaling many tens of millions of dollars, is a further example of Badger service to clients throughout the world.



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PROCESS ENGINEERS and CONSTRUCTORS for the PETROLEUM, CHEMICAL and PETRO-CHEMICAL INDUSTRIES

T. G. Hughes

T. G. HUGHES has been elected president of Oronite Chemical Co., chemical products subsidiary of Standard Oil Co. of Calif., to succeed George L. Parkhurst, who was elected chairman. Mr. Hughes, who joined California Standard in 1926, has been with Oronite since its formation in 1943 and has been executive vice president for the past year. Mr. Parkhurst succeeds R. G. Follis, California Standard's board chairman, who remains a director.

Venezuelan Production

Record month in Venezuelan oil production was January of this year, when several companies registered new all-time highs. As the table below shows, a decrease of 145,000 barrels per day, or nearly 10 percent, took place in February as the companies, acting in cooperation with the Venezuelan government, voluntarily reduced production in an effort to head off legislation designed to limit imports of foreign petroleum into the United States.

These figures represent production by concession titles and do not in all cases represent the ownership of the oil, since many concessions are held by two or more companies jointly with the title in the name of one. The figure for the month of March is estimated on the basis of latest available weekly production figures.

VENEZUELAN CRUDE OIL PRODUCTION
(Daily Averages in Bbls of 42 US gals.)

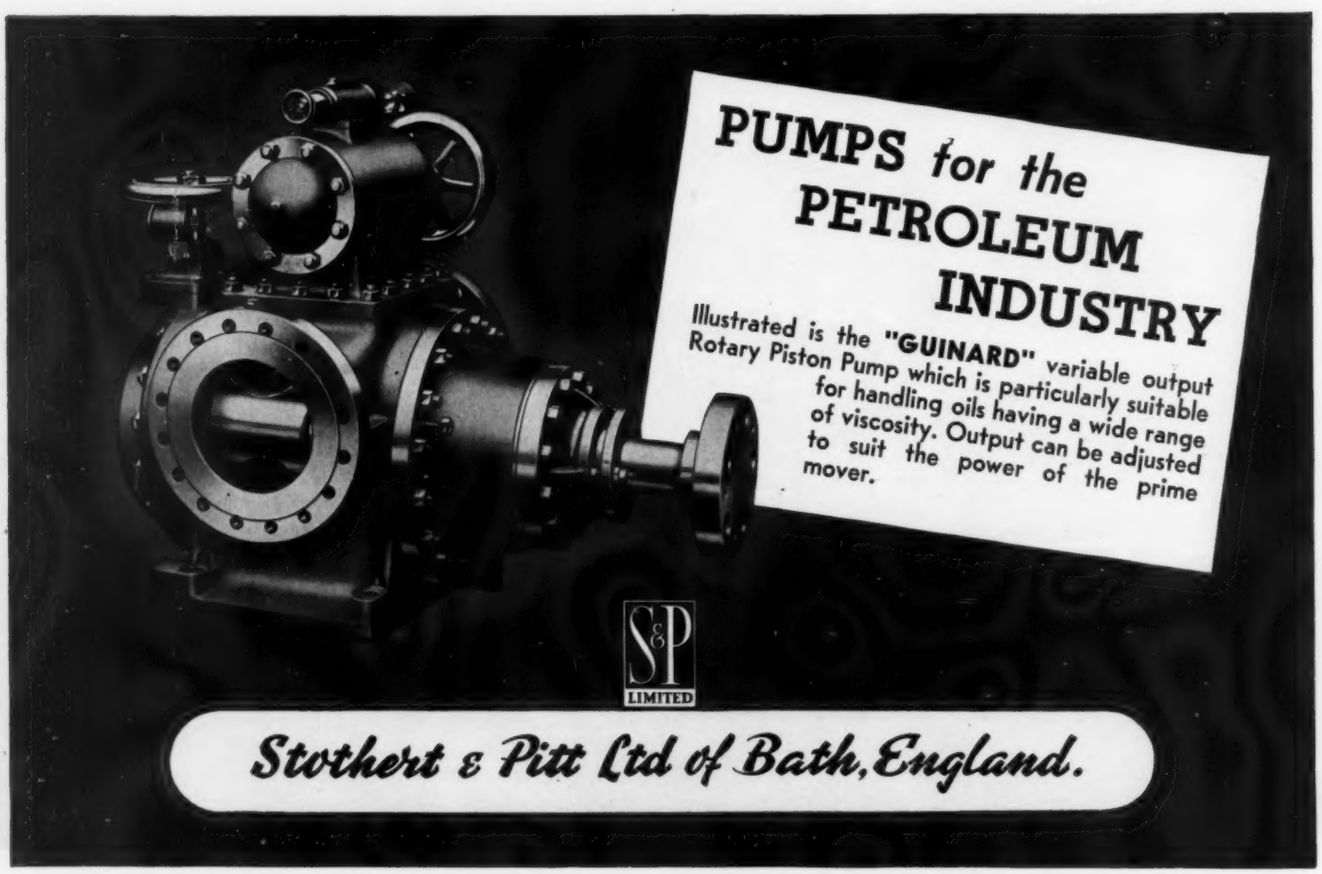
Company	January	February	March (est.)
Creole	620,547	559,320	616,000
Shell Group	457,263	440,228	439,000
Mene Grande	243,338	191,067	194,500
Texas-Mercedes	52,302	39,334	42,000
Socony	36,934	25,869	26,700
Ven. Atlantic	19,977	23,091	23,100
Sinclair	13,048	13,609	13,600
Pantepec	12,618	13,513	12,800
Phillips	7,079	7,739	8,400
Richmond	461	4,962	8,000
BCO, Ltd.	1,015	1,094	1,100
Guasare	105	85	100
Totals	1,464,687	1,319,551	1,385,300

Tubular Construction Exhibit

Wellington Tube Works Ltd., manufacturer of tubes and fittings, which has specialized in developing the utilization of tubes far beyond the orthodox use for conveying gases and liquids, is exhibiting a considerable range of products incorporating tubular construction at the British Industries Fair. Among the many exhibits showing the successful application of tubular fabrication principles is a patented handrailing joint of exceptional efficiency and neatness. Several of the company's "Weldex" heaters are exhibited, as well as stampings produced by a subsidiary, Job Edwards Ltd., Wednesbury.

C. S. MITCHELL of Bartlesville, manager of crude oil supply and transportation for Cities Service Oil Co., has been elected a director of Cities Service Pipe Line Co. Mr. Mitchell joined the company as junior engineer in 1930. His sphere of service covers both natural gas and oil production, transportation, marketing and purchasing. After serving in the gas production and transmission fields, he was transferred to Bartlesville in 1939 as a member of the company's purchasing department. He recently was elected to the directorate of Texas-Empire Pipe Line Co., Kaw Pipe Line Co. and Texas-New Mexico Pipe Line Co.

C. S. Mitchell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H. J. Struth

H. J. STRUTH, petroleum consultant of Dallas, Texas, has just accepted an assignment as petroleum consultant to the Venezuelan government. He is leaving immediately for Caracas, where he will organize a petroleum statistical department for that government and will prepare an economic survey of the Venezuelan petroleum industry. His initial assignment will keep him in Venezuela for a period of about three months. Mr. Struth recently returned to Dallas from New York, where he was assistant director of information for the American Petroleum Institute.

Undertakes Atomic Researches

Standard Oil Co. of Calif. has formed California Research & Development Co. to undertake a new research project for the U. S. Atomic Energy Commission in the San Francisco Bay area. The new company is a wholly-owned subsidiary of California Research Corp., Standard's research organization. Officers of the new company will include Fred Powell, president, formerly general manager of Standard's El Segundo refinery, and J. Q. Cope, vice president, formerly chief engineer of Richmond laboratories of California Research.

Mack Sales Appointments

Three veterans in the sales department of Mack-International Motor Truck Corp. have been advanced to new positions, according to an announcement by H. W. Dodge, executive vice president. Pierce J. Fleming has been appointed manager of the off-highway sales division, A. F. Fenner, general sales manager in central, southwestern and Pacific coast divisions, as well as the Republic of Mexico, and E. G. Ewell has been made general sales manager in eastern, southern and Atlantic divisions.

To Build Treaters

The Catalytic Construction Co. has been awarded a contract to construct three gasoline treating units for the California Refining Co. at its Barber, N. J., plant. Construction will begin immediately on two lead sulfide sweetening plants and a reagent plant. Completion scheduled for August.

Twin Seat Valve

The Stewart Manufacturing Co., Stamford, Conn., has developed a twin-seat valve to replace the ball and seat in subsurface oil well pumps. The new valve was designed to eliminate flutter and pump slippage and to produce more fluid per stroke. The two seats increase resistance to both corrosion and abrasion.

Argentine YPF Buys Peruvian Crude

According to the Argentine-Peruvian trade agreement of last year, which provides a supply of 150,000 tons of Peruvian crude to Argentina, a first shipment of 127,000 barrels has been sold by Empresa Petrolera Fiscal. The government production and royalty oil will be carried by an Argentine tanker. Purchase price is officially indicated at about six million soles, ($400,000 U.S.)

Mexican Representative

Jay C. Failing has been appointed agent in Mexico for George E. Failing Supply Co. For the past several years he has been West Coast representative and will continue to handle this territory, in addition to his new Mexican assignment, from Los Angeles.

New Multipurpose Grease

Sinclair Refining Co. placed on the market April 1 a new multipurpose grease to be known as Sinclair Litholine. The grease is a combination of lithium base soap and a highly refined mineral oil.

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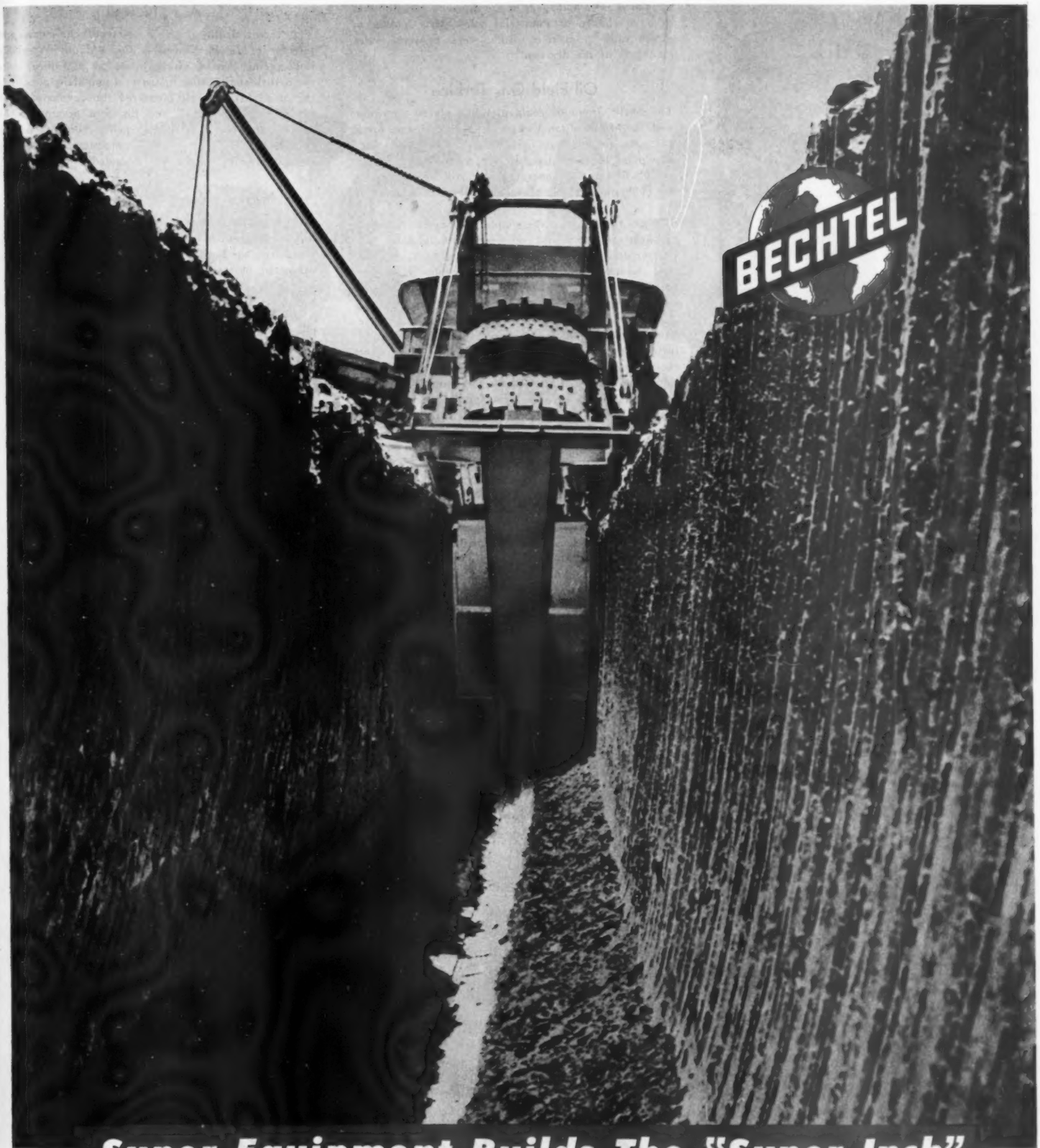

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Left to right: David H. Conklin, E. Hearn Simpson

Du Pont Sales Appointments

Four changes in personnel of the Du Pont Company's petroleum chemicals division, which handles sales of tetraethyl lead anti-knock compounds and other chemicals to the petroleum industry, have been announced. Joseph L. Stecher has been appointed assistant sales director of the division. He was manager of petroleum chemicals production.

Emory M. Fanning has been named assistant sales director of Kinetic Chemicals Inc., manufacturer of "Freon" fluorinated compounds for the refrigeration, air-conditioning and aerosol industries. Mr. Fanning formerly was petroleum chemicals sales manager. E. Hearn Simpson and David H. Conklin have been appointed sales managers of the division, Mr. Simpson to have charge of industrial sales, Mr. Conklin to direct sales promotion. Both were assistant sales managers of the division.

Oil Field Gas Turbine

The Shell Group of companies has placed an order with the Metropolitan-Vickers Electrical Co. Ltd. for a gas turbo-alternator set of 1,750 kW continuous rating. The plant is being designed for reliability over long periods of base load operation and will be installed in one of the fields of the Maracaibo area in Venezuela.

The gas turbine is of the simple, open-cycle type with out heat exchanger and comprises an axial-flow compressor designed for a pressure ratio of 5.0:1, combustion chambers and turbine. The turbine is direct-coupled to the compressor, running at 7,000 rpm and drives the alternator at 1,200 rpm through single reduction gearing. The combustion chambers are of the flame-tube type, situated between the compressor and turbine, and disposed symmetrically about the turbo-compressor coupling. This arrangement permits "straight through" flow with the minimum of pressure drop and affords ease of access to the rotor inboard bearings.

General particulars of performance are given below, based on design ambient air conditions of 14.7 psia and 95°F: Maximum continuous rating, 1,750 kW; turbine inlet temperature, 1,185°F; thermal efficiency at generator terminals, 15 percent; turbo-compressor speed, 7,000 rpm. A 60-hp electric motor is provided for starting, and it is expected that the length of time required to bring the set up to full load from cold will be not more than 15 minutes. A small quantity of cooling water, approximately 150 gallons per minute, will be required for the alternator air cooler and the oil cooler.

A. P. Newall

The recent death of A. P. Newall, chairman and founder of A. P. Newall & Co. Ltd., of Woodside Engineering Works, Glasgow, at the age of 69 robs the British engineering industry of one of its outstanding men. Mr. Newall pioneered the development of heat-treated steel bolts and his firm became world famous for their work in this field. Although not in good health in recent years, he maintained an active association with the firm he founded.

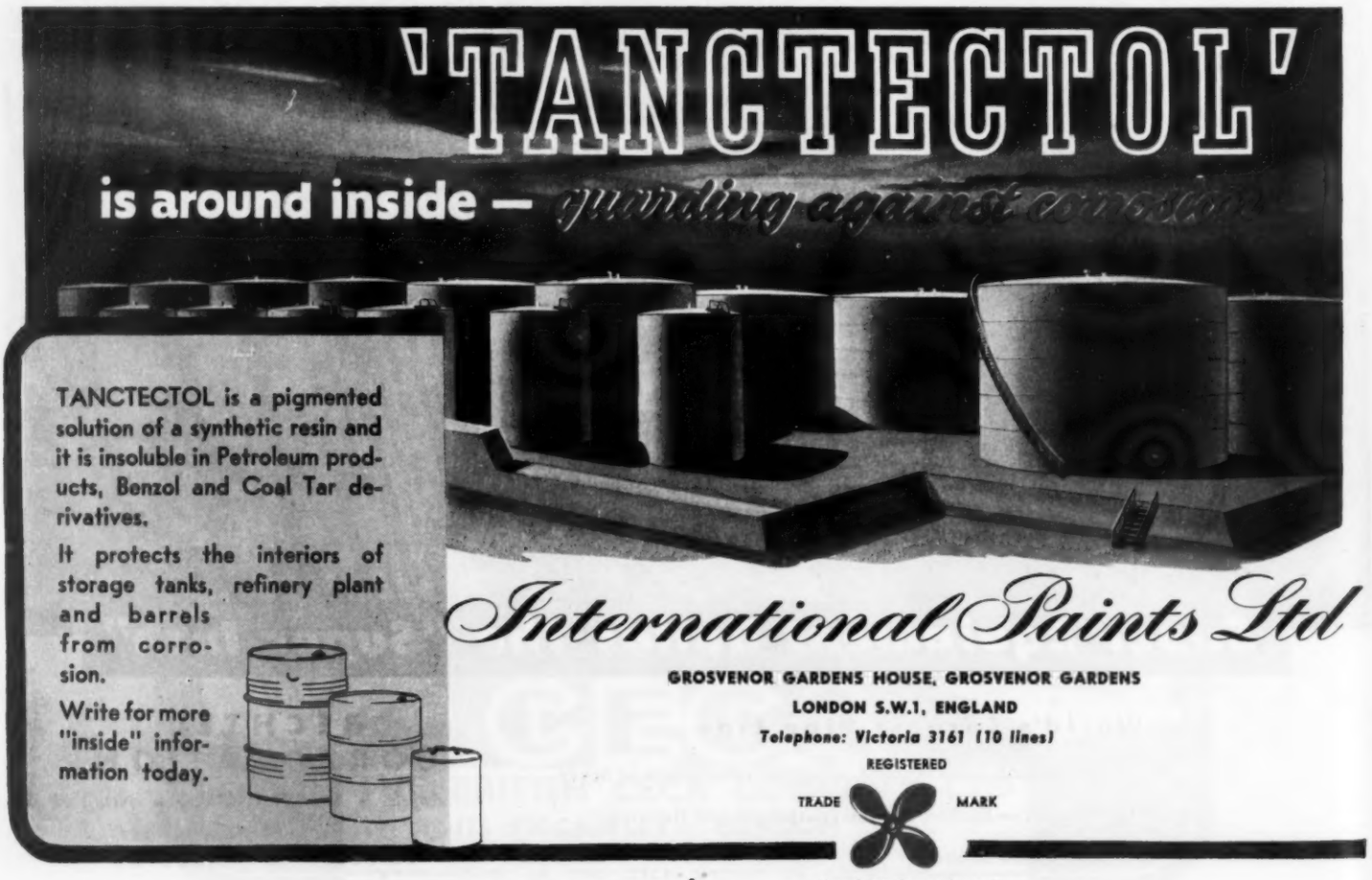
National Supply Appointment

R. Wesley Burns has been appointed division manager at Calgary, Alberta, for National Supply Co. Ltd. Mr. Burns has been with National Supply since 1921. His entire 29 years was spent as an oil field supply man in the Rocky Mountain area.

Papua Drilling Operations

Reports from Papua indicate that progress is being made on several locations. The Hohoro well has been cleaned out to bottom at 2,585 feet and drilling is going forward. At Upoia work is proceeding at 2,662 feet. Arrangements are going ahead at Malalaua for the erection of derrick, and at Wana the rig site is being levelled and foundations begun.

DR. NATHANIEL E. LOOMIS, widely known in the field of petroleum research, retired March 31 after 32 years of service with affiliates of Standard Oil Co. (N. J.) During his career Dr. Loomis participated in the basic development of oil cracking methods and the introduction of pipe stills and other modern refining processes. He is a vice president and a member of the board of directors of Standard Oil Development Co., central research organization of Jersey Standard. He is being succeeded by Eric W. Luster.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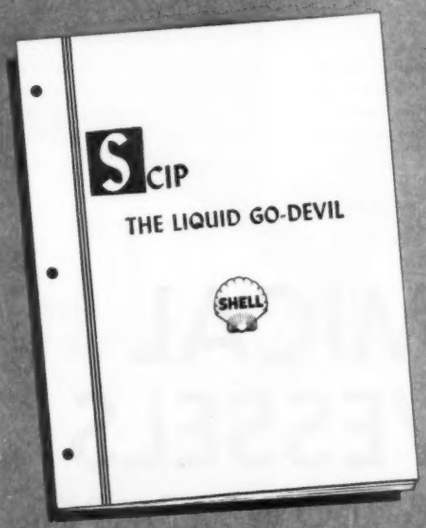

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M. V. British Explorer Launched

Harland and Wolff recently launched the M.V. British Explorer, a new single-screw motor-driven oil tanker, which they are building to the order of British Tanker Co. Ltd. The new 12,300-dwt. ton tanker is the first of three vessels of the same class which are under construction at Harland and Wolff's Belfast yard, where a large single-screw turbine-driven tanker of 28,000 dwt. tons for the same owners is also building. The vessel is propelled by a six-cylinder, single-acting, four-stroke diesel engine, having cylinders 740 mm. and stroke 1500 mm. working on the under piston system of pressure induction. The engine is conservatively rated and provides the necessary power at 115 rpm.

Mechanical Foam

The Pyrene Co. Ltd., Brentford, Middlesex, has prepared a comprehensive extract from the handbook, "Modern Fire Fighting," which it has published as a brochure titled "Mechanical Foam." The brochure is handsomely printed and provided with a durable cover which will add to its utility as reference material for fire marshals and fire brigades at all oil installations.

Explanations are given of the two methods by which Pyrene mechanical foam can be generated, with specifications and data enabling those responsible for fire protection to select the most suitable equipment. It is explained that the foam-making branchpipe necessitates the production of foam at the delivery end of the water line. It operates with pressures as low as 60 psi and is so designed that the operator may use either water or foam as required. The mechanical foam generators may be placed at a safe distance from fires. Water pressure of at least 150 psi is required to deliver foam through the hose beyond the generator. The new "Mechanical Foam" brochure devotes six pages to a discussion of various methods of foam compound induction.

A large section of the brochure is given over to oil storage tank protection installations. Both fixed and portable foam methods are detailed. With fixed foam branchpipe risers, or with mechanical generators connected to tanks containing highly volatile products, vapor seal boxes have been designed to permit foam tests without fouling tank or contents. The boxes are arranged to permit examination of the glass seal without loss of vapors.

Industrial Relays

Sunvic Controls, Ltd., London, has developed a new type PN relay consisting of from one to three Sunvic Hotwire Vacuum switch tubes mounted with appropriate resistances and surge suppressors on an insulated base plate. Sizes and capacities up to 30 kw are to be described in a new catalog supplement now in course of preparation. Copies will be available on request.

The Sunvic switch consists of an evacuated, sealed tube in various sizes suitable for either AC or DC. Since contacts are in vacuum, no arc is formed. Contact movement is small and requires little energy to operate, and this is provided by expansion of a wire.

Master Gauges

Coventry Gauge & Tool Co. Ltd. is licensed in Great Britain to manufacture reference master gauges to all API specifications. The company also produces working gauges in all sizes up to the 20-inch diameter gauges for line pipe and casing, including the fast taper gauges for rotary drilling equipment. All API reference master gauges are checked and certified by the National Physical Laboratory, who issue a certificate showing the sizes of the gauges, together with the "stand-off" (S) value for the mating plug and ring. The company has published a brochure titled Gauges for the Petroleum Industry which gives details of its products and American Petroleum Institute regulations for the production of API monogram standard products.

Worldwide Insulation Service

William Kenyon & Sons Ltd., Dukinfield, Cheshire, has published a leaflet which stresses the fact that the company and its associates offer heat insulation engineering service to oil refineries and chemical plants in every part of the world. Photographs in the publication illustrate work which has been done in the United States, Venezuela and France as well as in England. Associated companies listed are: Wm. Kenyon & Sons (America) Ltd., Perth Amboy, New Jersey, U.S.A.; Wm. Kenyon & Sons (Canada) Ltd., Montreal; Isolamiante, S. A., Roubaix and Paris; United Kingdom Peat Moss Litter Co., Ltd., Toombebridge, Co. Antrim, Northern Ireland; Daniel R. Douglas & Co., New York; Metalclad Insulation Co. Inc., Torrance, California; and Isolatt Cork Co. Ltd., Blackburn, England.

"Unionmelt" Arc Welding

As of April 1, 1950, all sales and service for Unionmelt automatic arc welding equipment in the United Kingdom will be handled by The Quasi-Arc Co. Ltd., Bilston, Staffs.

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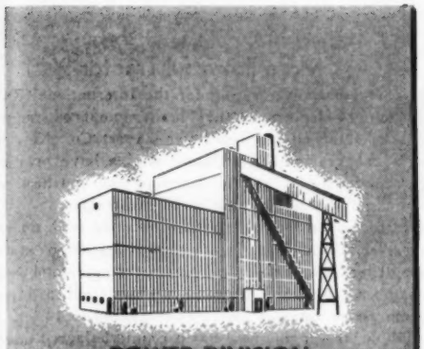
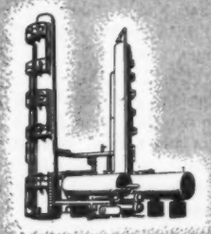
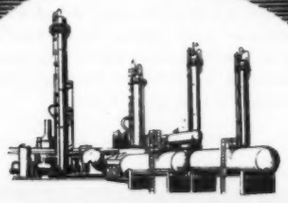


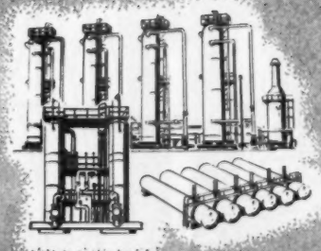
POWER DIVISION



CHEMICAL DIVISION



PETROLEUM DIVISION



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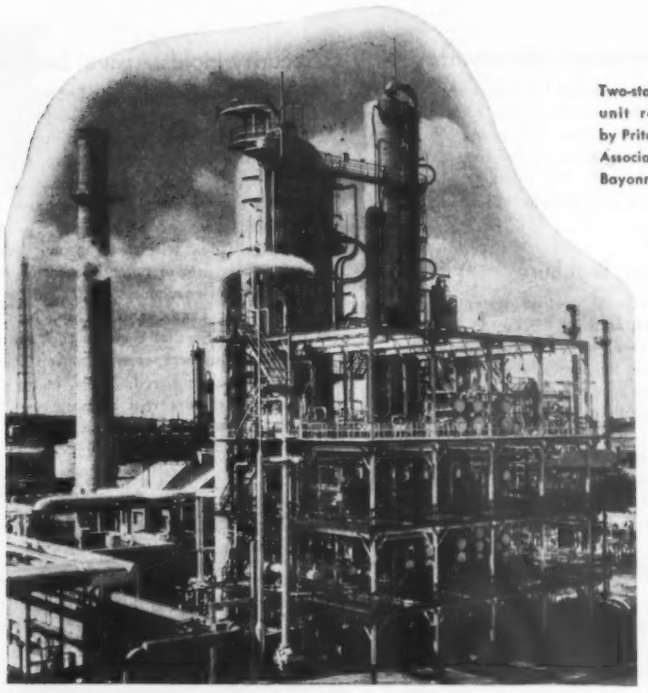

Two-stage crude distillation unit recently completed by Pritchard for Tide Water Associated Oil Company at Bayonne, New Jersey.

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Miniature Seismograph Instruments

Southwestern Industrial Electronic Co. has designed a miniature amplifier which is enclosed in a waterproof case measuring 6 x 13 x 21 inches and weighing approximately 35 pounds. It contains twelve type GA-11 amplifiers plus the control unit. The oscillograph unit measures 8 x 9 x 16 inches and weighs approximately 25 pounds.

Dowtherm Brochure

Application of the Dowtherm heating system is the subject of a brochure prepared by the Foster Wheeler Corp., New York. A pioneer in the application of the system in many of these industries, Foster Wheeler has embodied in the brochure the knowledge gained by the installation of more than 300 such systems. The new brochure is divided into two major sections. The first section contains simplified flow diagrams, flow descriptions, and photographs of a representative group of processes, while the second part describes Dowtherm and the various methods of utilizing it.

Floating Roofs Booklet

Chicago Bridge and Iron Co., Chicago 4, Ill., has published a new 20-page booklet, "Horton Floating Roofs," containing information on the reduction of evaporation loss and corrosion and the elimination of fire hazards in flat-bottom tanks storing volatile liquids and chemicals.

The three types of Horton Floating Roofs—Double-Deck, Pontoon and Pan—are described, and the service for which each roof is used is discussed. Cutaway views, typical plan views and cross section sketches illustrate the construction of the roofs and the accessories included with each installation. The details of the Horton sealing ring, which closes the space between the rim of the roof and the tank shell, are shown in diagrammatic views. Copy will be sent on request.

Security Holds Annual Sales Meeting

R. M. Cook, vice president and sales manager of Security Engineering Co. Inc., announced a successful annual sales meeting conducted recently in Albuquerque, New Mexico. Representatives were present from all domestic fields, Canada and Venezuela. Every phase of Security's operations was discussed and decision was reached to expand field coverage of Security representatives. This will mean a more complete field service to every user or potential user of Security products. Two new warehouses will soon be available at Colorado City, Texas, and Hobbs, New Mexico. It was concluded also that Security rock bit, reamer, hole opener and casing scraper warehouse stocking arrangements are to be improved. Thus, in the future, operators and contractors will be able to obtain the tool they want as rapidly as possible.

Sell-A-Vision Pump

Gilbert and Barker Manufacturing Co. has announced a new addition to its gasoline pump line; one designed to stimulate service station sales. The device consists of a moving tape which presents a sales message through windows in a pump at convenient eye level above the computing dials. Up to 55 characters can be accommodated on the tape which then will repeat the sales message five times a minute.

More Powerful Tractor

Higher horsepower rating for the International TD-9 Diesel crawler tractor has been announced recently by the International Harvester Export Co. New design changes in the 4-cylinder engine have provided more horsepower at the drawbar and flywheel and increased the work capacity of the tractor.

Greater engine power has been obtained with no rpm increase through a re-designed combustion system featuring new pistons, an improved pre-combustion chamber, simplified injection nozzles, and a higher compression ratio of 15.7:1 as compared to 14.4:1. In addition, the engine now has a counterbalanced crankshaft and new connecting rods for smoother operation and longer service life of the parts.

New Book

Natural Gas and Natural Gasoline, by R. S. Huntington, published 1950 by McGraw-Hill Book Co., New York; 598 pages, $8.00.

As declared on the dust-jacket, the purpose of this comprehensive new text is to give a general idea of the natural gas and natural gasoline branches of the petroleum industry, and to provide text material for students of petroleum, natural gas, chemical and mechanical engineering.

An examination of the text shows that the material provided is ample, well-arranged and reflects the actual field and plant experience of a specialist in this kind of engineering. The ten chapters cover estimation of gas and gasoline reserves, plant location and design, gathering raw gas, return of residual gas, cycling efficiencies, natural gasoline processing, absorption, distillation, fractionation, gas dehydration, storage, transportation and high-pressure pipe-line research along with specifications and testing procedures. Recent advances in this field are discussed with illustrative examples. It is a good book.

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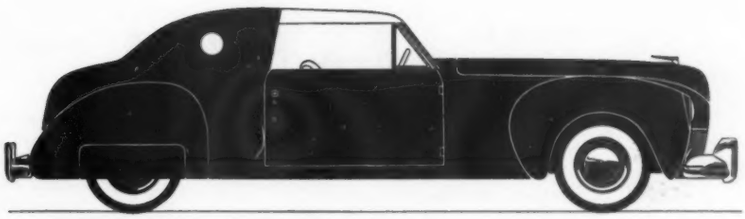

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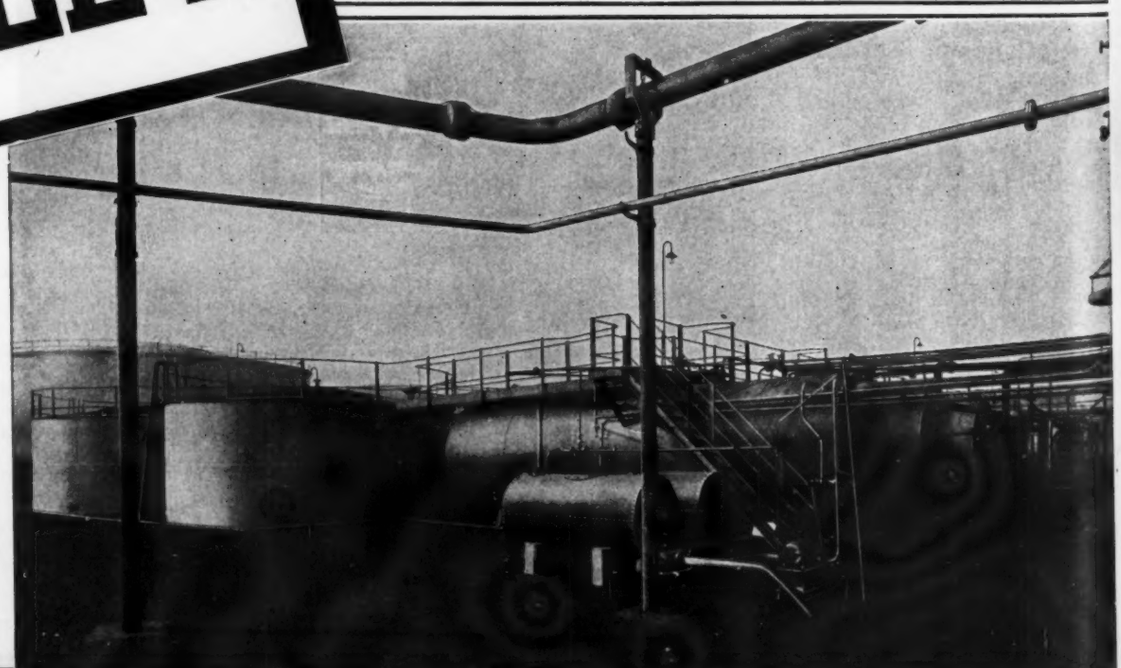

Part of a battery of ten, electrically-welded steel storage tanks 9'x0" dia. x 30'0" long with tank in background 25'0" dia. x 10'0" deep. Erected at Ellesmere Port, Cheshire. (Photograph by courtesy of Lobitos Oilfields Ltd.)

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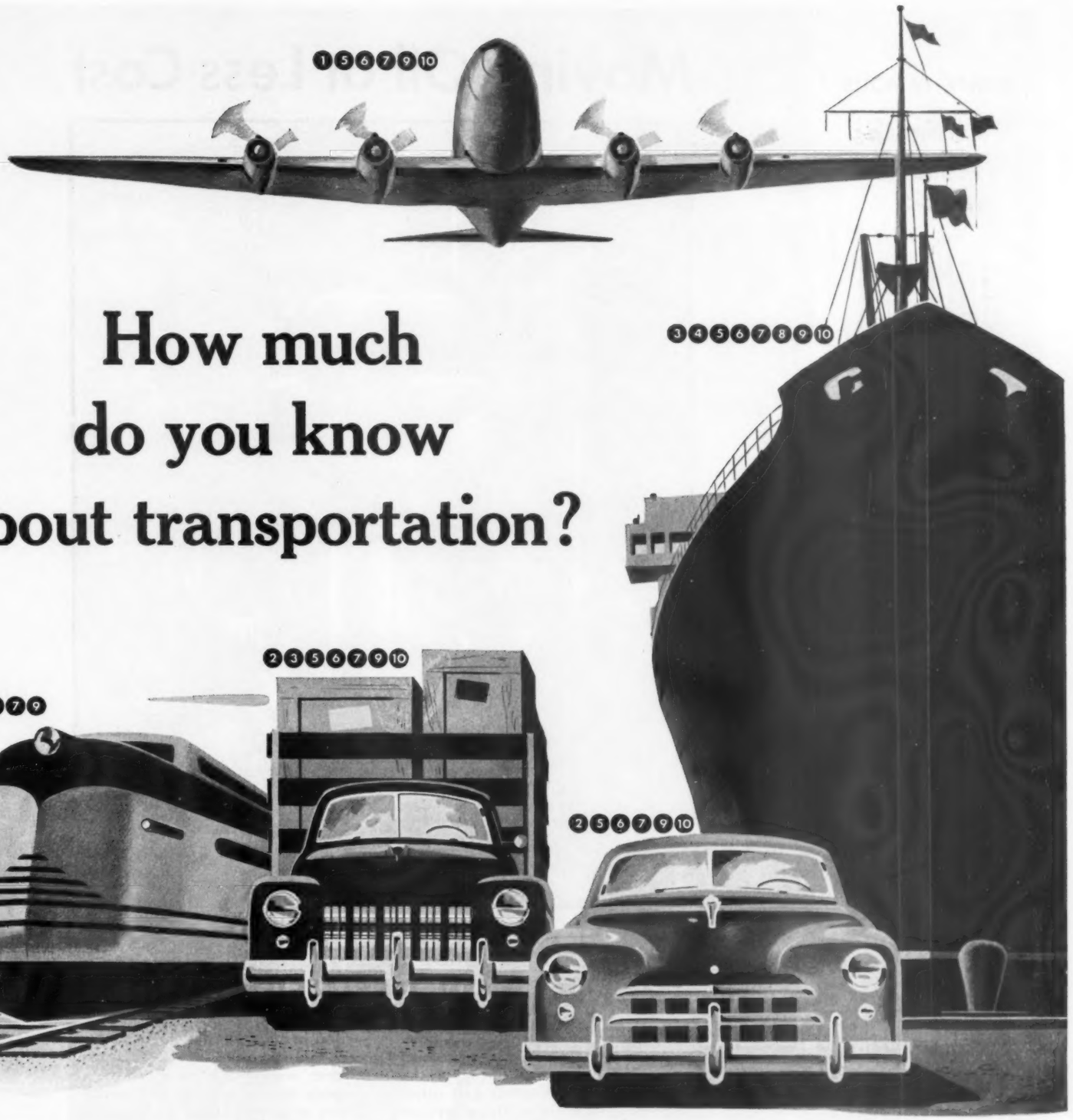

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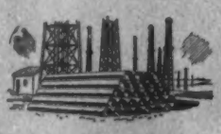
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